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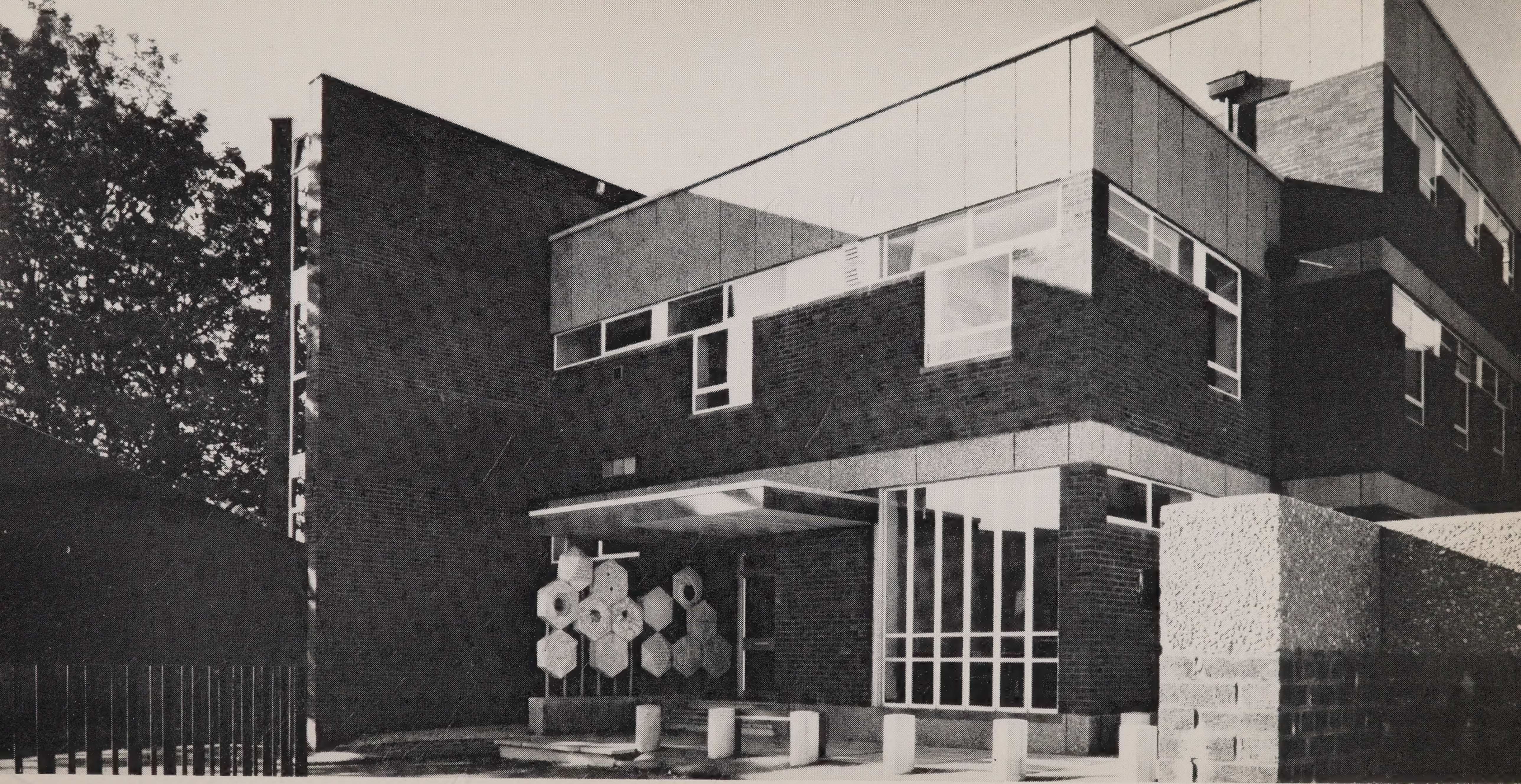
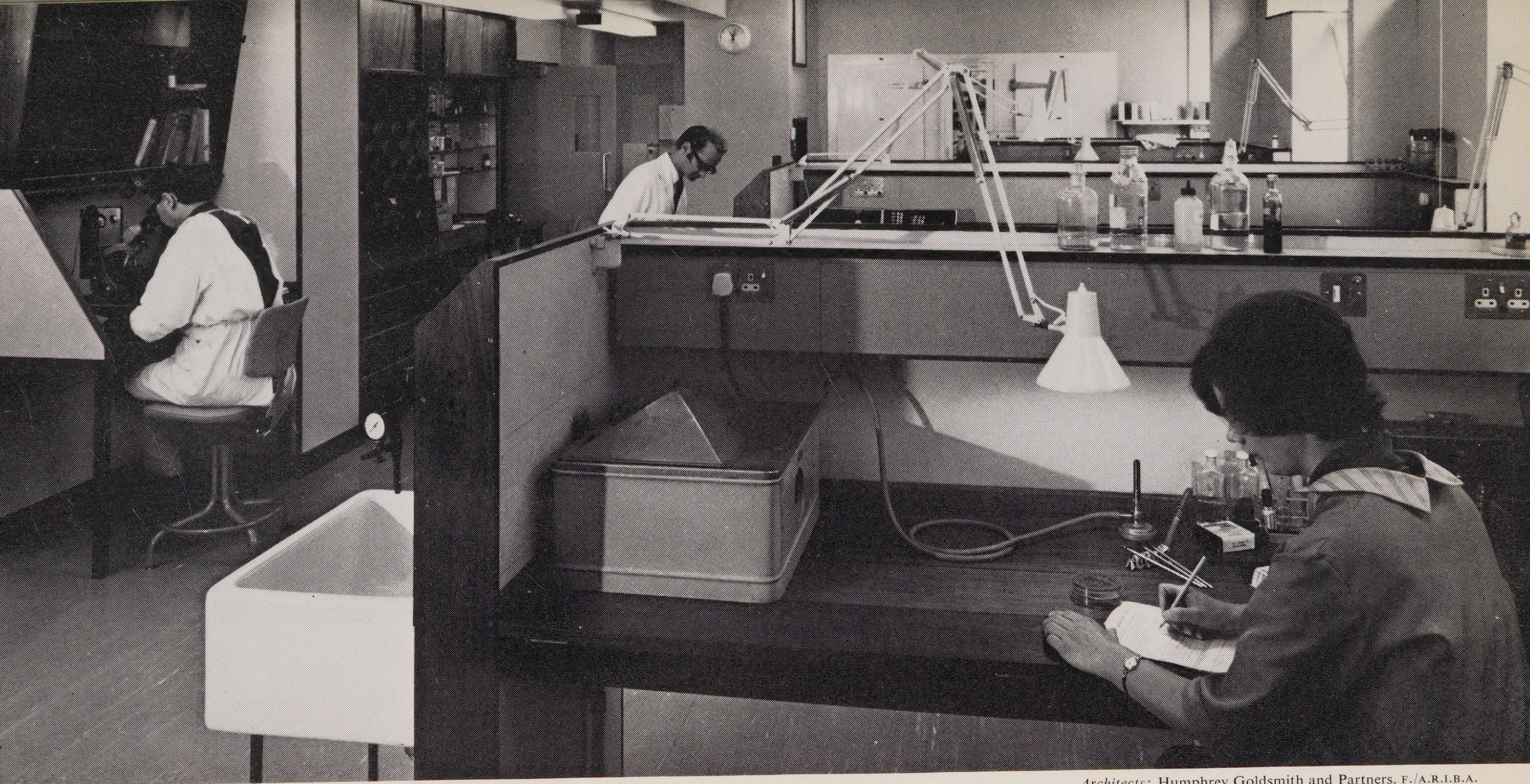


REGIONAL PUBLIC HEALTH LABORATORY, BRISTOL
1969
MAIN ENTRANCE

Architects: Humphrey Goldsmith and Partners, F./A.R.I.B.A.
18 Gay Street, Bath, Somerset

Photographer: Derek Balmer, 13 Westbury Park,
Durdham Down, Bristol

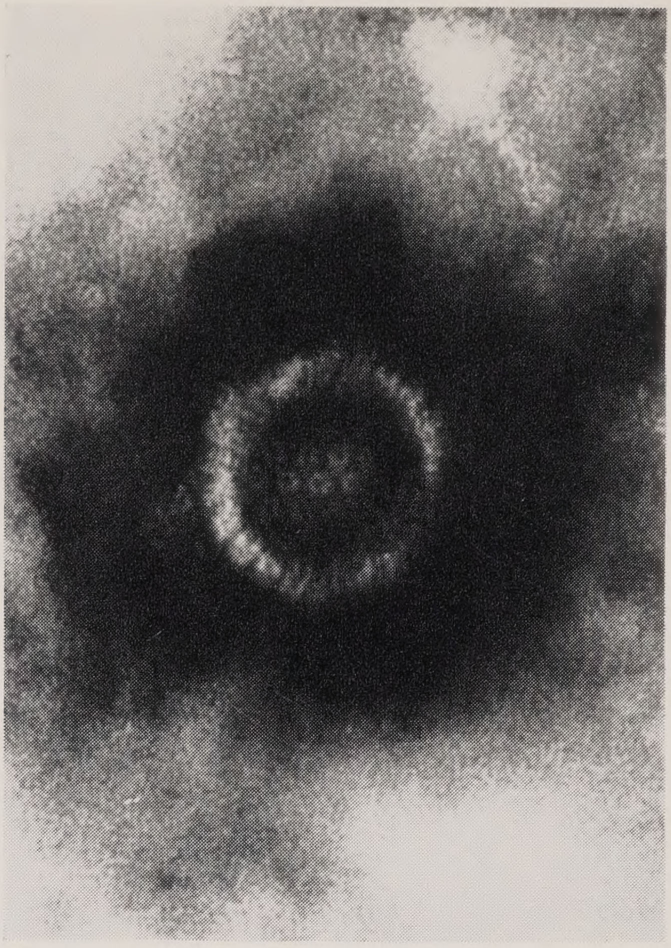


REGIONAL PUBLIC HEALTH LABORATORY, BRISTOL
1969
GENERAL LABORATORY

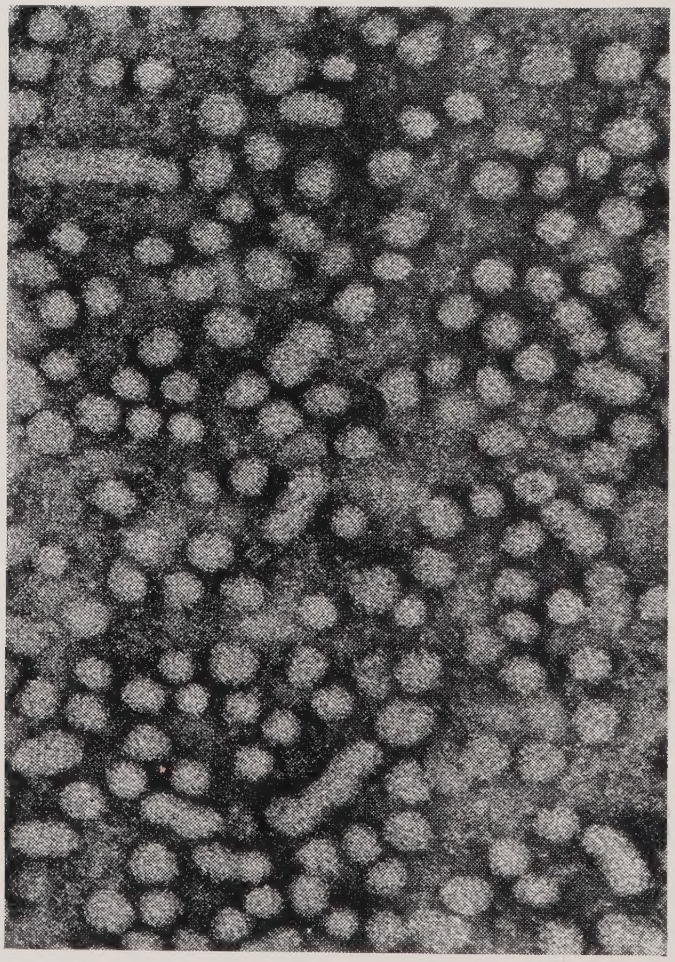
Architects: Humphrey Goldsmith and Partners, F./A.R.I.B.A.
18 Gay Street, Bath, Somerset

Photographer: Derek Balmer, 13 Westbury Park,
Durdham Down, Bristol

MICROGRAPHS



Cytomegalovirus particle (magnification × 240,000)
(*see page* 13)



Australia antigen particles (magnification × 180,000)
(*see page* 21)

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THE PUBLIC HEALTH LABORATORY SERVICE BOARD

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Members: F. A. Adams, C.B.
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R. C. Bryant, C.B.
(late Under-Secretary, Board of Trade)

Professor A. C. Cunliffe, M.A., M.D., F.R.C.Path.
(Professor of Bacteriology, University of London, at King's College Hospital Medical School, London, S.E.5)

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M. T. Parker, M.D., F.R.C.Path., Dip.Bact.

Secretary:
J. D. Whittaker, M.B.E.

HEADQUARTERS ADMINISTRATIVE OFFICE

24 Park Crescent, London, W1N 4DA
Tel.: 01-636 2223

Sir James Howie, LL.D., M.D., F.R.C.P., F.R.C.Path. (*Director of the Service*)

J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact. (*Deputy Director of the Service: see also* pages 29 and 40)

J. D. Whittaker, M.B.E. (*Secretary of the Board*)

R. H. Westlake (*Finance Officer and Deputy Secretary of the Board*)

J. W. Bushell (*Establishments Officer*)

R. V. Jackson (*Accountant and Supplies Officer*)

*A. Waltho (*Officer in Charge*), MRC Central Store, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 0071

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* Member of the staff of the Medical Research Council.

INTRODUCTION

ADMINISTRATION AND ORGANISATION OF THE SERVICE

The Public Health Laboratory Service is the successor of the Emergency Public Health Laboratory Service planned, organised and administered during the war years 1939–1945 by the Medical Research Council, at the request of H.M. Government. In 1945 it was decided by the Government to retain the Service on a permanent footing. Statutory authority was provided by Section 17 of the National Health Service Act, 1946, which empowered the Minister of Health to provide a " bacteriological service " for the control of the spread of infectious diseases. Later the Medical Research Council agreed to an extension of the period of their administration, with the delegation of detailed responsibility to the Public Health Laboratory Service Board appointed by them for this purpose. In 1960, however, the Public Health Laboratory Service Act, 1960, established and incorporated a new Public Health Laboratory Service Board as a statutory body capable of acting in its own right as agent for the Minister. The Act also provided for the transfer of staff of the Service from the employment of the Council to that of the Board, and the transfer of property from the Council to the Minister of Health; these transfers took effect on 1st August, 1961.

The Chairman and members of the Public Health Laboratory Service Board are appointed by the Secretary of State for Social Services and, in accordance with the Schedule to the Act, the members must include the following (and must therefore be at least eight in number, in addition to the Chairman):

(*a*) not less than two persons appointed after consultation with the Medical Research Council;

(*b*) not less than two persons with experience as bacteriologists, appointed after consultation with such organisations as the Secretary of State thinks appropriate;

(*c*) not less than two persons holding office as medical officer of health to a local authority;

(*d*) not less than one person appointed after consultation with such organisations as appear to the Secretary of State to represent the hospital service;

(*e*) not less than one fully registered medical practitioner engaged in general medical practice, appointed after consultation with such organisations as the Secretary of State may recognise as representative of practitioners so engaged.

The Chairman and members of the Board are normally appointed for a term of three years.

The Board exercises its functions in accordance with any directions received from the Secretary of State for Social Services. In the exercise of these functions it acts as a principal.

The staff of the laboratories of the Service are appointed and employed by the Board. The directors of the constituent laboratories are whole-time medically qualified bacteriologists, with full consultant status. Professional staff are selected to a large extent from newly qualified medical graduates after they have held house appointments for 12 months or longer, they then receive five years' training in pathology and bacteriology. During the third year the trainee is required to obtain the Diploma in Bacteriology of the University of London or of the University of Manchester. The Service also receives fully trained recruits from the Hospital Service and from the universities. As a general rule, science graduates without medical qualifications are employed only in the reference laboratories (*see* page 40) where the work is of a highly specialised nature.

The technical staff of registered medical laboratory technicians are recruited from boys and girls leaving school at 16 to 17 years of age, who have attained the necessary standard of education; they go through a system of training in academic and practical subjects now becoming general in pathological laboratories throughout the country.

The development of the Service between 1946—in which year it was established in its present form—and 1969 may be summarised as follows:

	1948	1955	1962	1969
Number of Constituent Laboratories	36	56	59	63
Medical staff	84	124	132	148
Scientific staff		26	39	73
Technical, Clerical and Maintenance staff . .	562	778	956	1,208
Total specimens examined . .	793,314	1,689,033	2,314,126	3,520,000

SCOPE OF THE SERVICE

The Public Health Laboratory Service is designed to make the laboratory investigations needed to provide a continuous picture of the communicable microbial diseases of England and Wales. These diseases must be accurately defined by identifying the agents that cause them, by continuously seeking out and recording their whereabouts, and by investigating what really matters in promoting or limiting their spread. The activities of the P.H.L.S. allow useful advice to be offered to the central and local health authorities, and to others concerned with the control and prevention of these diseases.

The Service at present consists of 10 Regional Laboratories (*see* page 30), 53 Area Laboratories (*see* page 32), and 17 Reference and Special Laboratories (*see* page 40), most of the latter being grouped as the Central Public Health Laboratory at Colindale, London, N.W.9. Almost all the Regional and Area Laboratories are situated in hospitals, and in addition to their specifically public health functions act as the microbiological component of a group laboratory undertaking clinical work for the hospital staff and for local general practitioners. Public health work is undertaken for medical officers of health over a wider area. In certain places where there is not a Public Health Laboratory, arrangements are made for this work to be done by a hospital bacteriologist acting for the Public Health Laboratory Service. Personal consultation between clinicians and the medical staff of local health authorities are welcomed. Members of the laboratory staff are prepared to investigate outbreaks of communicable disease in the field if asked to do so.

In certain circumstances Public Health Laboratories receive specimens from general practitioners outside the normal clinical area of the group laboratory; for example, specimens of public health interest requested by the medical officer of health, or specimens needed as part of one of the nationwide surveys which form a major activity of the Service. The Reference and Special Laboratories normally receive specimens only from other laboratories.

All specimens must be submitted by doctors, veterinarians, dentists, public health inspectors, and others acting on behalf of medical officers of health, Government departments, or representatives of other official bodies; specimens cannot be accepted from private persons (see, however, sub-paragraph (*b*) below).

The routine specimens fall under two main heads:

(*a*) " Clinical " specimens received from hospitals, general practitioners and local health authorities. These are specimens of sputum, faeces, throat swabs, blood samples, etc., taken from persons suspected of suffering from (or being capable of transmitting) a microbial disease.

(*b*) " Sanitary " specimens: these are received from medical officers of health, public health inspectors, and others concerned officially with the control of the public health. They comprise specimens for bacteriological examination of water, shell-fish, watercress, sewage, milk and cream; of processed foods such as ice-cream, artificial cream and canned foods; and of imported products such as the various forms of meat, fish, processed egg, coconut and fertiliser. The Service normally examines only material offered to the consumer, but will, of course, examine specimens taken at any stage of production or distribution by medical officers of health investigating suspected food-borne infections. The Service is ready to give free advice to food manufacturers and processors to assist them in the production and distribution of bacteriologically safe products. For routine control of such products, commercial firms are charged a fee, but work of this sort is undertaken only exceptionally.

The epidemiological work of the Service includes not only the investigation of outbreaks of infectious disease, in co-operation with local medical officers of health, but also studies of the distribution and behaviour of infectious agents throughout England and Wales, and of the various aspects of the immunisation programme. Epidemiological information is collected centrally week by week from public health and hospital laboratories all over the country, including Scotland, Northern Ireland and Eire and then made available to each of these laboratories in turn in the form of a confidential weekly " Communicable Diseases Report ".

Field investigations of infectious disease, and field trials of protective agents, including vaccines, are frequently carried out. All laboratories are engaged to some extent in research in addition to routine work.

A special feature of the Service is the investigation of various problems by Working Parties containing a dozen or more members drawn from laboratories in different parts of the country. Some of the problems investigated are of direct concern to Government Departments, with which close working relations have always existed.

Brief mention has already been made of the reference laboratories and specialist departments. These provide facilities for the exact identification and " finger-printing " of organisms belonging to many different groups. This is sometimes required by clinicians in their treatment of patients, but more often for epidemiological purposes. The reference laboratories are freely available for consultation by any laboratory within or without the Service. In addition, a number of reference experts are retained for the examination of occasional specimens which require special skill, special knowledge, or special reagents.

The Service distributes various vaccines and sera on behalf of the Department of Health and Social Security. It also provides certain reagents for diagnostic purposes, prepared by or issued from the Standards Laboratory for Serological Reagents at the Central Public Health Laboratory, Colindale Avenue, London, N.W.9 (*see* page 42).

Directors of Public Health Laboratories are always prepared to discuss the facilities they can offer, either directly or through other units of the Service, and how these facilities may best be used.

GRANTS AND OTHER ASSISTANCE RECEIVED FOR SPECIAL INVESTIGATIONS IN 1969

The Public Health Laboratory Service Board now receive valuable assistance from the Departmental Research and Development Fund of the Ministry of Health. Allocations from this fund have enabled the Board to undertake the following important projects, involving research work of an " operational " nature:

> The establishment of a special laboratory for the study and typing of mycoplasmas—this being a necessary preliminary step towards the provision by the Service of reference facilities for these organisms.
>
> Laboratory investigations into farmers' lung.
>
> An investigation of laminar flow ventilation and the determination of its effectiveness in protecting hospital patients who are at special risk to cross-infection.
>
> Research on infectious hepatitis. The purchase of marmosets to be used in the investigation.

Research on non-bacterial enteritis

The establishment of reference facilities for monitoring transferable drug resistance.

The surveillance of whooping cough and B.C.G. vaccines.

The Board also receive grants from the following bodies for the assistance of special investigations and the acquisition of major equipment of a special nature:

From the World Health Organisation:

$3,500 for the assistance of laboratory research on enteric phage-typing at the International Centre recognised at the Enteric Reference Laboratory, Colindale, London.

$3,500 for the International Shigella Centre recognised at the Dysentery Reference Laboratory, Colindale, London.

$3,000 for the International Reference Centre for Staphylococcal Phage-typing recognised at the Cross-Infection Reference Laboratory, Colindale, London.

$1,000 towards the cost of testing the specificity of virus antisera at the Standards Laboratory for Serological Reagents, Colindale, London.

$2,500 for the preparation and testing of reagents (rhinovirus), at the Virus Reference Laboratory, Colindale, London.

$4,000 towards the cost of epidemiological serological investigations of tropical sera for antibodies in treponematoses at the Venereal Diseases Reference Laboratory, London Hospital Research Laboratories, London.

Grants are held by the following individual members of the Board's staff:

(*a*) From the Medical Research Council:

Dr. I. G. Murray (Director, Mycological Reference Laboratory, London School of Hygiene and Tropical Medicine).

Provision for research in serological methods in the classification of pathogenic fungi and in the diagnosis of mycoses.

Dr. P. G. Higgins (Virologist, Epidemiological Research Unit, Cirencester).

Provision for research into the application of organ cultures to the diagnosis and epidemiology of virus infections in the general community.

Dr. J. O'H. Tobin (Director, Public Health Laboratory, Manchester).

Provision for research on cytomegaloviris infections.

Provision for research into rubella vaccination in " post-partum " women.

In addition to the provision of research grants described above, two research projects are in progress jointly with the Medical Research Council, in which members of the Council's scientific staff are collaborating. These are as follows:

Research work on viruses at the Epidemiological Research Unit, Cirencester, Gloucestershire;

Various studies at the Cross-Infection Reference Laboratory, Colindale Avenue, London, N.W.9.

Laboratory Directors of the Service are also carrying out investigations in conjunction with general practitioners and hospital medical officers in many places, notably in the study of chronic bronchitis, of hospital cross-infection, and of sterilisation and disinfection problems; on gastro-enteritis and the safety of various foods.

A clause of the Schedule of the Public Health Laboratory Service Act, 1960 permits the Board to accept, hold and administer private gifts on trust for any purpose related to the Public Health Laboratory Service or otherwise connected with bacteriological research. Donations received during 1969 were as follows:

£12.15s.od. from Mrs. Christine M. Walker of Derby, in memory of her husband.

£50 from the Ames Company towards the cost of a urine survey being undertaken by Dr. J. D. Abbott of the Manchester Laboratory.

£200 from the Bayer Products Company towards the cost of an investigation on urinary pathegens being undertaken by Dr. P. J. Wormald of the Salisbury Laboratory.

A fluorescence microscope from the Ciba Foundation to the Tuberculosis Reference Laboratory, Cardiff.

REVIEW BY THE DIRECTOR OF THE SERVICE OF ACTIVITIES IN 1969

LABORATORIES

The Birmingham Public Health Laboratory moved to its new premises at the East Birmingham Hospital on 30th November, 1969. The official opening will be held during 1970.

The Public Health Laboratory, Bournemouth moved to its new premises at Poole General Hospital at the beginning of May 1969. The new laboratory was officially opened on 11th July, 1969.

The Bristol Public Health Laboratory moved to its new premises at Myrtle Road, Bristol on 12th February, 1969. The new laboratory was officially opened on 9th May, 1969.

The new Public Health Laboratory at New Cross Hospital, Wolverhampton was opened on 1st November, 1969.

RETIREMENT AND RESIGNATIONS

Dr. J. A. Boycott, who has been a member of the Public Health Laboratory Service since 1946 and Director of the Taunton Laboratory since October 1947, retired on 31st March, 1969.

APPOINTMENTS

Dr. P. Cavanagh took up the post of Director at the Stafford Public Health Laboratory in August 1969.

Dr. C. Dulake was promoted to Consultant Bacteriologist, Deputy Director of the Guildford Public Health Laboratory from November 1969.

Dr. C. H. L. Howells was appointed Honorary Director of the new Public Health Laboratory at Wolverhampton. He took up the post during July 1969.

Dr. P. D. Meers took up the post of Director of the Public Health Laboratory, Plymouth on 20th January, 1969.

LOCUMS

We are most grateful to the following people for help with locum duties: Dr. Bessie E. Cadness Graves at Watford, and Dr. R. Norton at Sunderland.

SECONDMENTS ABROAD

Dr. R. Blowers returned from Uganda where he held the Chair of Microbiology at Makerere University College. He took up his former post as Director of the Middlesbrough Public Health Laboratory in July 1969.

Mr. T. J. Donovan, Chief Technician at the Maidstone Public Health Laboratory, was seconded to the Jinnah Postgraduate Medical Centre, Karachi for a period of two years from October 1969.

Dr. C. S. Goodwin returned to the Portsmouth Public Health Laboratory in September 1969 on completing his secondment to the Ethiopian Leprosy Mission.

VISITS ABROAD BY MEMBERS OF THE SERVICE

Dr. J. D. Abbott, Dr. E. H. Gillespie, Dr. Sheila Polakoff, and Dr. T. N. Stanbridge attended a Round-Table Conference on Pertussis held in Bilthoven, Holland under the auspicies of the Permanent Section of Microbiological Standardisation of the International Association of Microbiological Societies. While in Holland Dr. Abbott also went to the Laboratory of Dr. K. W. Slaterus, University of Amsterdam, to discuss current work on meningococci.

Dr. E. S. Anderson was invited by the Organising Committee of the VIth International Congress of Chemotherapy to Chair a Symposium on Biochemical and Genetic Mechanisms of Drug Resistance. The Congress was held in Tokyo. Dr. Anderson also accepted an invitation to attend the International Symposium on Resistance to Infectious Disease held in Saskatchewan. While in Canada Dr. Anderson talked at a National Convention in Saskatoon about transferable drug resistance and attended a meeting of the Canadian Medical Veterinary Association. He spent a short time in Geneva and other European centres by invitation of the World Health Organisation where he assisted in the setting up of a survey of transferable drug resistance in Europe and elsewhere in which his laboratory will take part.

Dr. B. E. Andrews went to Brno, Czechoslovakia to give a lecture to the Medical and Veterinary Faculties there. He then travelled to Budapest, Hungary where he also gave a lecture to the Medical and Veterinary Microbiology Institutes.

Dr. B. W. Barton and Dr. A. H. Tomlinson attended the IInd Conference on Antiviral Agents held in New York. They both gave papers at this Conference.

Dr. C. M. Patricia Bradstreet attended the World Health Organisation Seminar on Meningococcal Diseases which was held in Khartoum.

Dr. J. E. Cradock-Watson, Dr. J. Craske, and Dr. D. Reid attended the XIIth Symposium of the European Association against Poliomyelitis and Allied Diseases, held in Bucharest. Dr. Cradock-Watson also travelled to Prague to attend a Symposium on Bacteriocines and Bacteriocine-like substances.

With the support of a World Health Organization Junior Research Training Grant, Dr. J. Craske is to work with Professor J. L. Melnick for a period of one year in the Department of Virology at Baylor University College of Medicine in Houston, Texas.

Dr. Anne M. Field attended the IInd Meeting of the North West European Microbiological Group which was held in Stockholm and was organised by the Microbiology Societies of the North West European countries. This meeting included two symposia, one on the Cell Wall and the Cytoplasmic Membrane of Bacteria, and the other on Adenoviruses.

Dr. A. L. Furniss visited the Cholera Research Laboratory, Dacca, East Pakistan to continue with his work concerned with the organisation of the bacteriological laboratory.

Dr. E. H. Gillespie, and Dr. C. E. D. Taylor attended the VIIth International Congress of Clinical Pathology in Montreal. The various symposia of this Congress included one on Mycoplasma and one on Immunofluorescence in Diagnosis.

Dr. R. J. Henderson attended and read a paper at a World Health Organisation Seminar on Methods of Surveillance of Communicable Diseases held in The Hague. National surveillance programmes of certain selected communicable diseases of public health importance in the World Health Organisation European Region were discussed.

Dr. P. G. Higgins went to Warsaw to attend a conference on respiratory viruses.

Mr. L. R. Hill attended the IXth Conference on the Taxonomy of Bacteria held in Brno, Czechoslovakia and he presented four papers. Mr. Hill also went to Naples for the UNESCO/ICRO Training Course on DNA/RNA Hybridisation.

Dr. Betty C. Hobbs accepted an invitation by the Association of Microbiological Societies to attend the International Committee on Microbiological Specifications for Foods held in Dubrovnik. Dr. Hobbs also accepted an invitation to give a paper on Safety and Quality at the United States Army Laboratories, Natick. During her visit she also spent time at other centres in the United States and Canada to discuss various microbiological problems in connection with foodstuffs and at the IAMS Food Committee. Dr. Hobbs travelled to Ludhiana to spend time working in the bacteriology laboratory of the Christian Medical College and Hospital.

Sir James Howie represented the British Medical Association at the Annual Meeting of the Danish Medical Association held during August. Sir James also continued his association with the Pakistan-SEATO Cholera Research Laboratory by attending a meeting of the Technical Committee in Dacca as United Kingdom representative.

Dr. L. Hoyle visited various places in Sweden to discuss some new techniques in the study of influenza virus structure.

Dr. A. E. Jephcott spent two months at the Statens Seruminstitut, Copenhagen, working under Dr. Alice Reyn in order to develop his current work on the gonococcus.

Dr. J. C. Kelsey visited Chicago to attend the American Chemical Specialities Manufacturers Conference where he was invited to give a paper. While in the United States Dr. Kelsey spent a few days at the Communicable Disease Center, Atlanta.

Mr. W. R. Maxted spent three weeks at the laboratory of Dr. H. C. Dillon, Associate Professor of Paediatrics at the University of Alabama in order to integrate the results of a study of antigenic structure of nephritogenic streptococci, upon which they have collaborated over a number of years.

Dr. J. H. McCoy accepted an invitation from the World Health Organisation to attend the IIIrd Meeting of the FAO/WHO Expert Committee on Milk Hygiene, held in Geneva.

Dr. B. Moore accepted an invitation to be the main medical speaker at the IVth International Colloquium on Medical Oceanography during the session dealing with sea-water and disease.

Dr. I. G. Murray visited the British Society of Mycopathology, Dublin. He also attended the International Symposium on Yeasts held in Delft to read a paper on candidiasis. Dr. Murray spent six weeks in Teheran by invitation of the World Health Organisation.

Dr. M. T. Parker, Dr. D. C. J. Bassett, and Mr. W. R. Maxted travelled to Jena to read papers at a symposium on streptococcal infections. From Jena, Dr. Parker travelled to Poland to lecture in various centres by invitation of the Polish Ministry of Health.

Miss Christine M. Philpot attended a meeting of the British Society of Mycopathology held in Dublin.

Dr. Joan Taylor accepted an invitation to attend the Round Table Conference on Vaccines for Salmonella, Shigella, and *V. cholerae* held in Berne, Switzerland. She took the Chair at one session and presented a paper. Dr. Taylor went to Paris for an International Meeting on the Bergey Manual of Determinative Bacteriology. She attended the International Symposium on Infant Hygiene where she gave a paper on Infantile Enteritis. She also discussed salmonellas with Professor Le Minor.

Dr. J. O'H. Tobin visited The Hague to attend the IIIrd International Conference on Congenital Malformations.

Dr. L. H. Turner attended the WHO Advisory Panel on Leptospirosis, of which he is a member. The meeting was held in Geneva.

Dr. A. E. Wilkinson attended a meeting of the Scientific Group on Treponematoses Research of the World Health Organisation held in Geneva. The meeting was held in order to plan further research activities by the World Health Organisation in this field.

VISITING WORKERS

Many people spent periods at the laboratories at Colindale, Bristol, Carmarthen, Cirencester, Exeter, Leeds, Leicester, Liverpool, Manchester, Oxford, Poole, Portsmouth, Sunderland, Tuberculosis Reference Laboratory and the Venereal Diseases Reference Laboratory.

ROUTINE WORK OF THE SERVICE

In 1969 the 63 Regional and Area Laboratories of the Service examined 3,520,000 specimens, of which 164,900 were virological. As before, the work came from hospitals, local health authorities, general medical practitioners, and veterinarians. The routine work continued to provide the basis for numerous epidemiological investigations and for a number of surveys. The extent and nature of these activities may be judged from the committees and working parties (pages 59 to 65 Appendix I) and to lists of published papers (pages 67 to 76, Appendix II).

SCIENTIFIC WORK

*The Work of an Area Laboratory in a Rural District.** The Director of an Area Public Health Laboratory is often the sole local representative of his particular speciality. In this situation, I have always thought that a personal reference system to the literature was essential to supplement the helpful and efficient services furnished by the Central Library. Towards the end of the year, therefore, I found myself mulling over chosen references and sorting through notes compiled for publications, actual or projected, and for lectures and discussions. Occasionally projects which have been depressingly unsuccessful are thus brought to mind; but at least the process guarantees a review of the activities of the laboratory during the preceding year. Most of the work probably differs little from that done in any area laboratory in a similar district, but in 1969 there seemed to be a theme running through the year: that of new and better communications which developed from an invitation to speak at a Regional Board Study Group.

The hospital has always been generous in helping me to entertain visitors; so we held a meeting for the Chief Public Health Inspectors in the area. At a previous visit to one of their monthly meetings, I spoke on salmonella infections; but on this occasion, perhaps inappropriately, we followed a good lunch by a lecture from me on food poisoning and then adjourned to the laboratory for demonstrations and discussion. For our part, we learned something of the difficulties of local health administration and hope we laid the foundation for the proper joint investigation of food poisoning outbreaks. Out of the discussion, a number of minor projects arose, one of which concerned bacterial counts in cooked meats, an extension of work we had been doing on media for the isolation of *Staphylococcus aureus* from these foods. It also resulted in an invitation being extended to us to visit a local nationally known factory and to discuss matters of common interest with their bacteriologist. A second minor project concerned salmonellae in abattoirs, a subject we had not previously investigated in this area.

---

* Contributed by the Director of an Area Laboratory.

We have also had a number of other meetings, both technical and medical, which have often resulted in papers and demonstrations being prepared jointly with our colleagues in pathology. The recent branch meeting of the Association of Clinical Pathologists was an example of this sort of co-operation. Nevertheless we still consider that our weekly domestic meetings, where we discuss clinical aspects of our technical work, are often of greater value; but the programme is altered when epidemics spring into the national headlines, such as the foot and mouth outbreak, and the gastro-enteritis in children's hospitals.

Fortunately smallpox has not been a recent problem; but it may come again and we have taken two steps to prepare against this eventuality. A clinical assistant has been appointed to the hospital to deal with certain aspects of staff health and we have succeeded in arranging the terms of his appointment to allot him special responsibility for the vaccination of casualty, mortuary, and laundry employees. In addition, discussions with the County Medical Officer of Health (MOH) have brought my smallpox file up to date, and all staff who may be concerned know where it is to be found in my absence.

Water supplies in rural areas continue to present problems; but few bacteriologists in this country can still be involved in a hospital doing major orthopaedic surgery whose water supply comes from two springs. For many years, these two springs have emerged high up on an escarpment, providing between them some 60,000 gallons of water per day with little seasonal variation. At first this was more than enough for a private estate, then for a sanatorium and finally even sufficient for a chest and orthopaedic hospital. However, one spring has now become polluted due to the sale of land on one side of the hospital site where the catchment area has now been developed for intensive farming, with its large concrete enclosures and enormous manure heaps. For the local bacteriologist this has meant meetings with engineers, administrators, finance officers, and legal advisers involving discussions on chlorination, legal obligations, fire fighting, and mains pressure. Compensation was found in a few pleasant hours in glorious weather, inspecting the gathering grounds and in a number of interesting talks with the local MOH on the subject of water supplies in general. During the past year we have also completed the examination of all employees of the local water company to eliminate chronic typhoid carriers. This has been achieved by a few examinations each week over a long period and consequently we are now in a position to keep a check on new employees with ease.

The rural areas surrounding our city account for our continued interest in brucellosis and milk and milk products. The number of producer retailers marketing unpasteurised milk shows a fall throughout the country and this has been marked locally due to the continuous surveillance by the local County Health Authorities. In a sense this surveillance has been greater during the past year as our investigations for the working party on fresh cream have involved visits to producers both large and small. Although this has meant a great deal of extra technical work, there are certain compensations in a steady supply of cream to the laboratory. A good quality cream is never wasted!

Fortunately, outbreaks of infection have been few. Influenza last year struck during school term thus involving us in epidemics affecting local schools, one in particular being of sufficient interest to be worth recording in the Communicable Disease Report. Another concerned a group of patients already occupying beds in a chest hospital. The virus was isolated and a rise in serum titres was observed; but no illness was associated which could be described as anything other than mild. Almost a year later the same virus was responsible for a very different illness, and the specimens we have examined have come from adult patients desperately ill with pneumonia. An appreciable number of isolations have been made from post-mortem specimens.

Other minor outbreaks of infectious hepatitis, sonne dysentery, and streptococcal infections have all been encountered; but one anomaly has been the absence of infectious mononucleosis from the local training college. Each year for many years glandular fever has affected a proportion of new students. This year we collected serum from 100 volunteers in order to study this disease, but so far no case has appeared.

In hospitals, responsibility for control of infection necessitates a continuous monitoring system and clinicians rightly expect the subject to be discussed at their clinical meetings. Our very active group of obstetricians has recently discussed our observations on the colonisation rate of new-born children with staphylococci. The same group also considered rubella in all its aspects. A practical outcome was an agreed tightening of our follow-up procedure in suspected cases, beginning with a clinical and virological examination at birth and proceeding to audiology clinics later in life. Other activities in the hospital involve committee meetings—the most interesting, although the most frustrating, being those concerned with planning. More formal activities have involved lectures to student nurses, technical college students, physiotherapists, and food handlers.

Meanwhile the work of the laboratory has shown its apparently inevitable increase, but it is gratifying to observe a rise in the proportion of work done for general practitioners and public health authorities. This is probably due to our better communications fostered by our activities including participation in working parties chosen because their work involves these two groups.

Current Studies of Cytomegalovirus Infection. Interest in cytomegalovirus (CMV) infection has been aroused in the United Kingdom recently by the work of Stern and his colleagues[1] in London. Although no nation-wide survey has been initiated by the Public Health Laboratory Service, several of its laboratories have been actively studying this infection.

The pattern of acquisition of complement-fixing antibody to CMV was found to be similar in Manchester[2] to that found in London[3] with about 10 per cent of infants acquiring the disease within the first year of life, 10 per cent during their primary school education, and up to a further 40 per cent becoming infected during adolescence and early adulthood. After 35 years of age the number of new infections is apparently small. The time of acquisition of antibody is delayed and the proportion at every age is lower with CMV than with other members of the herpes virus group, suggesting that CMV is less infectious than its related viruses. In spite of a 5 per cent CMV carrier rate in 5–6-year-old primary schoolchildren, the proportion of their classmates acquiring the disease is very low. In contrast to rubella virus, CMV does not apparently spread to any extent to susceptible staff from a congenitally infected baby in spite of high virus titres in urines and throats. All these findings suggest that very close contact is required for virus spread and that CMV should be included among the "kissing" diseases.

Although rates of virus excretion from 3–10 per cent have been found in surveys of infants and young children admitted to hospital in London, Bristol and Manchester, the relation of the clinical condition responsible for their hospitalisation and CMV infection is often obscure. Most acquired infection is sub-clinical, the commonest manifestation probably being infectious mononucleosis and pyrexia of unknown origin sometimes associated with hepatitis[1] and polyneuritis.[4] Cases of these conditions are being diagnosed by Public Health Laboratory Service laboratories with increasing frequency.

The symptomatology of congenital infections is better documented. Babies born with this infection sometimes have severe involvement of the central nervous system with intracranial calcification, microcephaly, spastic paralysis of one or more limbs, chorioretinitis, and mental retardation. Infection can also produce hepatosplenomegaly, petechiae and thrombocytopenia. Certain structural defects such as cleft palate, heart defects, hernias and biliary atresia may occasionally be associated with CMV infection. Although it was once thought that congenital infection usually caused serious illness, and a high chance of mental retardation, it is becoming apparent that most cases progress satisfactorily unless the central nervous system is shown to be involved at or within a few months of birth. In Manchester all except 2 of 30 infants without signs of central nervous system disease during the neonatal period have progressed satisfactorily for periods of observation up to three years. The two exceptions became progressively retarded during the first year of life. Those with neonatal hepatitis have also apparently recovered from their initial illness within a few months as judged by liver function tests. These findings do not mean that CMV is not an important cause of mental retardation or occasional cases of chronic hepatitis in the young. Stern and his colleagues (1969)[5] have shown that it is probably more important as a cause of microcephalic mental retardation than rubella or toxoplasmosis; and in a survey in Manchester the rate of mental retardation in infants and young children admitted to hospital was six times higher in CMV excreters than in those not excreting virus.

In Manchester, 13 excreters were found amongst 3,182 newborn babies, giving a rate of congenital infection of 4.1 per thousand. A predominance of cases was found amongst babies of unmarried mothers (8.8 per thousand) as compared to those of married ones (<1.5 per thousand). As this suggested the possibility of spread *via* the genital tract, CMV was sought there. In Manchester and Leicester it was found that from 1–4 per cent of women attending hospital clinics were excreting CMV in the cervix, irrespective of what type of hospital clinic they attended. Alexander (1967)[6] showed that in Taiwan, where most people are infected with CMV very early in life, cervical excretion was very much higher (18 per cent) and he suggested this was recurrent infection. As infection in infancy and childhood is much less in England, cervical excretion would be expected to be much less if due to early infection. It seems that, like herpes virus, CMV can recur but chooses the cervix as its site of recurrent replication rather than the mouth. Certainly in acquired and congenital infection the cervix is involved in the generalised infection and occasionally may act as a reservoir for the spread of virus in the adult.

Studies at Bristol,[7] Colindale,[8] and Manchester have shown that, in England as elsewhere, infection can be transmitted by blood transfusion during heart operations, organ transplants, exchange transfusions and other procedures. It is probable that about 5 per cent of donors in England are capable of transmitting CMV to recipients and although most of such infections are subclinical some patients develop the "post-transfusion " syndrome—a form of infectious mononucleosis (Lang and Hanshaw, 1969).[9]

CMV infection must be considered a common and important infectious disease and well worthy of study on a large scale. It is a more common congenital infection than either rubella or toxoplasmosis and probably causes more severe clinical disease in adults than either of these agents.

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Recent work in leptospirosis. For some years the Leptospirosis Reference Laboratory has been interested in improving the diagnostic capability of the Public Health Laboratory Service and of Group Laboratories in respect of human leptospiral infections. It was thought that much leptospirosis might be undetected because of limited diagnostic facilities and the failure of clinicians to submit sera from likely cases.

In the first place—and contrary to a widely held belief—strains of *Leptospira* in the United Kingdom are *not* restricted to the ictero-haemorrhagiae and canicola serogroups. Other serogroups are are represented:[1] javanica, ballum, autumnalis, australis, and the part of the large hebdomadis serogroup which will be known as the sejroe serogroup when the subdivision proposed by Kmety is accepted. The reservoir hosts of these strains are hedgehogs, field mice, voles, and shrews; but mice (house pests, pets, laboratory stock) and laboratory rats may also be involved. Man may be infected at work or recreation in the countryside, or in the laboratory.

It is impracticable for general duty laboratories to maintain the requisite number of strains for use as antigen suspensions in agglutination tests; nor is it feasible for the Reference Laboratory to distribute such collections reguarly. Formerly, some eight laboratories maintained strains belonging to the ictero-haemorrhagiae and canicola serogroups only; these were used when clinicians requested agglutination tests.

Few clinicians realise that leptospiral infection may be one of the causes of various febrile syndromes other than Weil's " disease " (which may have causes other than *Leptospira*) or it may cause nondescript illness (pyrexia of unknown origin).[1 2] Leptospirosis may also present as aseptic meningitis or encephalitis; it may also cause illnesses like influenza, typhoid fever, atypical pneumonia, acute poliomyelitis, rickettsioses, glandular fever, brucellosis, and so forth. Jaundice is not the commonest symptom of leptospirosis; when present, it is often associated with normal or only slightly raised serum transaminase concentrations—in marked contrast with infectious hepatitis. This observation[5] is supported by the information already secured in this country.

The precise identity of the infecting strain of *Leptospira* is not necessary for the treatment of patients nor for general epidemiological purposes. Agglutination tests can no longer be regarded as " serotype-specific ", but they often indicate the serogroup to which the strain belongs;[4] and this is adequate. Identification of the infecting strain is possible only by either a series of agglutinin-absorption studies of the patient's serum—which is impracticable as a routine procedure—or by isolation of the strain itself.

For serological diagnostic screening a single antigen for use in an established routine test is ideal. Various so-called " genus-specific " tests have been proposed,[4] among which a complement-fixation (CF) test using a single antigen prepared from strain Patoc 1—which belongs to the saprophytic (biflexa) complex—was advocated by Rumanian workers.[5 6 7] This test has been evaluated (unpublished data) by the Reference Laboratory in collaboration with Dr. A. F. Mohun (Whittington Hospital, London, N. 19). Experience with thousands of sera obtained from the U.K. and from countries where other serogroups occur has shown that results of the microscopic agglutination test and the Patoc CF test accord very well.

The CF antigen is stable if kept at 4°C and may be supplemented by the addition of antigens representing locally important serotypes in order to give more definitely positive reactions. This antigen has been distributed to more than 50 P.H.L.S. Laboratories and to various Group Laboratories: some include the antigen in the routine virological screening CF test; others carry out separate tests; but some may not use the antigen.

For years the Reference Laboratory has used the microscopic agglutination test with formalised antigens representing all the recognised serogroups of *Leptospira*. Sera are screened after filtration at final dilutions 1 in 10, 1 in 100, and 1 in 1,000. Follow-up investigations of positive cases have shown that titres remain high (1 in 300 or greater) for at least 1–2 years—and the period is probably much longer. Very few U.K. sera have reacted even at low titres which might indicate past infection. Few surveys have been carried out recently but two series of farm workers (Scotland, Worcestershire) and one group of underground sewer workers (Bristol) have all given very low reactor rates (<1.0 per cent) and then at very low titres (1 in 10 or 30).

It is probably fair to conclude that the incidence of human leptospiral infections in the U.K. is running at a low rate, about 40–50 cases per year—as indicated in the C.D.R. returns. However, the leptospires are all around us; outbreaks sometimes happen; and cases due to " unusual ' serotypes *may* raise as happened with scattered infections with strains in the hebdomadis (sejroe) serogroup in 1968. As it is impossible to control infection in the reservoir hosts, the situation must be monitored. Screening of sera from febrile patients with the CF test and subsequent agglutination tests with reacting sera at the Reference Laboratory should achieve this object without much difficulty.

This work will be greatly assisted if we are ever able to persuade our clinical colleagues always to provide two dates: that of the onset of the illness and that on which the serum was collected. Immunological responses are dynamic and related to the duration of infection and illness. Clearly, this consideration applies with equal force to other diagnostic work in serology.

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Reports on Public Health and Medical Subjects No. 71*: Bacteriological Examination of Water Supplies—Fourth Edition*, 1969. This report was first published in 1934 and this edition—the fourth—was prepared by the Public Health Laboratory Service Standing Committee on the Bacteriological Examination of Water Supplies. This Committee consists of some twelve members of the staff of the Service, together with representatives of the Metropolitan Water Board, Society of Medical Officers of Health, Water Research Association, Department of Health and Social Security, and the waterworks industry.

As before, the report is divided into three parts. Part I, General, has been shortened considerably, largely by avoiding some of the duplication in the 1956 edition and by omitting the section on swimming bath water. Part II, Sampling, has been lengthened slightly, largely by the addition of a section on the frequency of sampling. Part III, Technical, has also been lengthened somewhat, largely by the introduction of a description of the membrane filtration method of examination.

Throughout the report the Committee has taken notice of the fact that more than 95 per cent of the population of the United Kingdom now has a piped water supply of drinking water, almost all of it chlorinated. The report stresses that all piped supplies should be chlorinated before distribution and a careful check kept on the chlorine residuals, however good the original water may have been.

In Part I, the section on Standards has been altered considerably; a distinction is made between chlorinated and unchlorinated supplies entering the distribution system—though it is stressed that piped supplies of unchlorinated water are not recommended—and a distinction is also made between water entering the distribution system and samples taken from consumers' taps and other points in the distribution system. The table for the classification of unchlorinated water entering the distribution system, which appeared in earlier editions of the report, has been omitted—though its provisions were considered in suggesting standards for unchlorinated water entering the distribution system and also for standards for samples taken from the distribution system.

It is pointed out that chlorinated supplies are quite as liable to deterioration in the distributing system as are unchlorinated supplies and that in this respect no distinction can be made between them. The standards given for samples taken from the distribution system are largely based on those given in the 1961 edition of European Standards for Drinking Water, though they are given in rather more detail. The importance of re-sampling as the minimum action to be taken when coliform organisms are found in any sample of drinking water is stressed.

In Part II, Sampling, a good deal of attention has been paid to the frequency of sampling both of water entering the distribution system and water in the distribution system. Apart from stressing the importance of frequent sampling the 1956 edition suggested no frequency for sampling. In this edition frequencies very similar to those proposed in European Standards have been put forward as a general guide.

It is pointed out that it is the responsibility of water undertakings to arrange for the collection and examination of samples from the distribution system and to keep medical officers of health of the local authority districts served by them informed of the quality of the water distributed in their areas. Samples collected and examined on behalf of medical officers of health serve as a valuable independent check, and the importance of close liaison between water undertakings and medical officers of health to avoid unnecessary duplication and the collection of excessive numbers of samples, is emphasised.

In Part III, Technical, a number of changes have been made. The membrane filtration method for examination for coliform organisms has been introduced—for the first time in this report—and the advantages and disadvantages of this method, as compared to the multiple-tube method, have been discussed. A minerals-modified version of Gray's improved formate-lactose-glutamate medium has been included as a preferred alternative to MacConkey broth for the multiple-tube test for coliform organisms; and lactose-ricinoleate broth has been suggested as an alternative to brilliant-green broth for confirmatory tests.

The table for the differentiation of coliform organisms by IMVIC typing has been omitted, since IMVIC tests alone are in many instances insufficient to make it possible to put a name to a particular organism. It is recommended that when special circumstances make it necessary to trace the source of contaminating organisms, IMVIC tests should be carried out and the results expressed as an IMVIC pattern. As an example *Esch. coli* if typed by the IMVIC method would be recorded as ++−−44°+ and the organism from jute packing formerly known as Irregular VI would be recorded as −−++44°+. *Escherichia coli* is referred to throughout the report without any qualification and it is defined for the purpose of this report where it is first mentioned. No specific names are used for other coliform organisms. The sampling error of the coliform count is discussed but the mathematics have been omitted and a reference given to where the confidence limits can be found.

Improvements in the methods of examination for faecal streptococci and *Cl. perfringens* (*Cl. welchii*) are described.

Examination of water supplies for pathogenic organisms is advised only for special epidemiological investigations. A method using a Kieselguhr filter aid for concentrating organisms is described. Detailed techniques for the isolation and identification of pathogenic organisms are not given, but there is a fairly comprehensive list of references. Selenite enrichment is no longer described as being useful for the Shigella group.

Whooping Cough—Progress Report. The whooping cough working party was set up in 1966 as reported in the Year Book 1967.

General practitioners were asked to report to the Medical Officer of Health any patient suffering from a paroxysmal cough, with or without vomiting, if they considered that whooping cough was a possible diagnosis. A member of the staff of the health department, usually a health visitor, visited the home within 24 hours and took pernasal swabs from the patient or patients, and from any siblings under five years of age. About three weeks later a second visit was made, details of the progress of the patients were recorded, and specimens were taken from any further patients with suspected whooping cough. Details of the history of vaccination were taken and all these were later checked with records of the family doctor or the local health authority. In the laboratory the swabs were examined for *Bordetella pertussis* or *parapertussis*. In some of the laboratories other swabs were examined for the isolation of viruses. All isolates of *B. pertussis* were serotyped by the local laboratory and by one of two " reference " laboratories.

Although the investigations were planned to run for six months it was soon apparent that the inquiry should be continued for a complete year. After the year it was concluded that while the results were being analysed the survey should continue for yet another six months so as to examine more cases and isolations of *B. pertussis* in the hope that the conclusions would be soundly based upon figures suitable for statistical treatment. Four lines of the investigation were proposed:

(i) To isolate and identify the serotypes of *B. pertussis* currently responsible for cases of whooping cough in the United Kingdom.

(ii) To examine the vaccination records of cases and contacts to determine which type of vaccine was used.

(iii) To assess the protective efficacy of the vaccines by determining the incidence of whooping cough in vaccinated and unvaccinated home contacts of cases.

(iv) To determine if cases clinically considered to be whooping cough, *i.e.* cases with typical " whoop " or cases of paroxysmal cough with or without vomiting, may be caused by other agents such as *B. parapertussis* or viruses.

The Preliminary Report of the first twelve months was published in 1969,[1] but the final report will not be prepared until the results of all the serotyping are available. The results of the eighteen months' survey will also be analysed.

In the year's survey, 1st November, 1966 to 31st October, 1967, a total of 3,564 households were investigated. Nine hundred and seventy-seven strains of *Bordetella pertussis* and six strains of *Bordetella parapertussis* were isolated from persons in 792 households.

After contact in the home 56 per cent of fully vaccinated children under five years of age developed a paroxysmal cough, and in more than two-thirds of these patients the diagnosis was confirmed bacteriologically. This suggests that pertussis vaccination was not very effective. A comparison with the attack rate in unvaccinated children also indicated a poor protection from vaccination.

None of the following factors appeared to be responsible for the poor protection afforded by vaccination: vaccination in early infancy, a long interval since vaccination, and the absence of booster doses.

Almost all the children in the survey had been given vaccines from a single manufacturer; therefore a comparison of the efficacy of vaccines prepared by different manufacturers was inconclusive. All the vaccinated children in the survey had been vaccinated before or during 1967. The efficacy of current preparations will require to be assessed by continuing surveillance.

This survey has meant a considerable amount of work by the health departments as well as by participating and reference laboratories and it has required extensive investigations by the Epidemiological Research Laboratory.

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Developments in the Study of Hepatitis. For a number of years, human hepatitis has been sub-divided on epidemiological grounds into infectious hepatitis and serum hepatitis. That the former is spread through contact, mainly by the faecal-oral route, was established more than 20 years ago. It was shown later that the causative agent could be found in the blood in the pre-illness period and transmitted by tranfusion also. Additionally, and reminiscent of poliomyelitis, the clinical manifestations could be checked by prophylactic immunoglobulin. Yet the disease has not been certainly transmitted to experimental animals nor has the causative agent, presumed to be a virus, been satisfactorily established in cell culture although numerous candidate viruses have been reported. Serum hepatitis on the other hand was until recently regarded purely as an artificial disease transmitted by parenteral inoculation; but human transmission from close contact and experimentally by mouth has now been reported. The boundaries between these two forms of hepatitis are therefore becoming less clearly demarcated; but until the causative agents can be isolated and clearly defined, it is difficult to agree on suitable alternative names. Infection with one form however does not produce immunity against the other.

There is concern over infectious hepatitis because its incidence appears to be increasing. As with poliomyelitis, perhaps, higher standards of hygiene may be inhibiting free dissemination of the virus and the rapid development of large scale immunity among the very young. With serum hepatitis also, the chances of transmission are greater due to the increasing use of blood and blood products and the unsterile use of syringes in drug addiction.

Human hepatitis acquired from contact with chimpanzees and other sub-human primates caused renewed interest in the possibility of experimental transmission of the disease. Little evidence of systemic infection in such animals could be found until it was shown that inoculation of South American marmosets with acute-phase serum from patients with infectious but not serum hepatitis was followed in a number of instances by elevation of the serum transaminase together with liver changes demonstrated by histological examination of biopsy material. Once established these effects could be transmitted in series. However the cost and the difficulties of maintaining these rather fragile primates has tended to limit such investigations. Doubts have been expressed also because the biochemical and liver changes might be due to a marmoset virus rather than to a human virus.

Fortunately there has been more progress in the study of serum hepatitis. During a search for serum isoantigens in isolated populations an antigen was found in the serum of an Australian aborigine which reacted in immunodiffusion tests with indicator sera from massively transfused individuals. In these persons the repeated stimuli could be expected to induce the formation of a variety of antibodies. This antigen was then shown to be present in varying degree in the serum of healthy persons from different countries, being more frequent in tropical areas; and an association with virus hepatitis was also observed. From its origin it has been called Australia or Au antigen. In separate studies by similar methods an antigen, named the SH antigen, was detected in the blood of patients with post-transfusion or serum hepatitis. Finally it was established that the two antigens were identical. The methods of antigen detection include the immunodiffusion technique originally used, complement fixation, which is more sensitive but requires more of the indicator serum, and electron microscopy in which the antigen deposited by high speed centrifugation is negatively stained. A problem hampering investigators particularly in this country has been a shortage of human indicator serum. Attempts to overcome this by the preparation of antiserum in animals are in progress but the antigen does not appear to act as a powerful stimulus. Nor, despite its size of 160-200 A measured by electron microscopy, is the antigen considered to be an infectious virus particle, though its presence is closely linked with infection.

The antigen is mainly associated with serum or post-transfusion hepatitis but has been reported present in some instances of sporadic hepatitis with no history of any form of inoculation. Characteristically it appears during the late incubation period, persists during the acute phase of illness, and disappears during convalescence though this is unrelated to the presence of specific antibody. In some healthy carriers who seem immunologically incapable of dealing with it the antigen has been found to persist for many years, an obvious danger in persons who act as blood donors. In persons with chronic active hepatitis or with some immunological deficiency associated with suppressive drugs the antigen may also be found to persist for years, again a danger to all close contacts.

This accumulation of information has made the study of the many problems of hepatitis hopeful. Various lines of work are now being undertaken within the Service. Obviously, much remains to be done.

Post-operative clostridial infections. Gas gangrene is such an uncommon complication of " clean " surgical operations that the individual surgeon or pathologist may have little personal experience on which to base his actions when a case appears. In 1966, therefore, the Cross-Infection Reference Laboratory tried to secure a clearer picture of the circumstances in which clostridial infections followed elective surgical operations on apparently uncontaminated tissues. Bacteriologists in public health and hospital laboratories were asked to notify all such infections and to answer a series of questions about each case.

In the course of two years, 85 illnesses due to clostridial infection of " clean " operation wounds were reported (Parker, 1969).[1] All but one was due to *Clostridium welchii.* Fifty-six patients had gas gangrene and 31 died from this cause; many of the survivors had to undergo further mutilating operations. The remaining 29 patients had local abscesses or necrosis but none of them died as a result.

Nearly all of the gas gangrene infections followed one of a very limited range of operations or surgical procedures; 39 followed the amputation of a leg, 11 followed other leg operations—all but one in the hip region—in which a metal or plastic object was implanted in the tissues, and three followed an injection or other puncture with a needle. Only three cases followed any other " clean " operation.

All of the infections were sporadic, and there was strong evidence that all or nearly all of them were self-infections from the faeces, in which *C. welchii* is nearly always present. Ayliffe and Lowbury (1969)[2] showed that the skin of the perineum, buttock, and thigh is often heavily contaminated with clostridia. It is not surprising, therefore, that operations on the thigh and hip should carry a particular risk of gas gangrene, but other predisposing causes were present in nearly every case. All but three of the amputations were in patients with a poor arterial blood supply to the leg, and all of the other leg operations involved the implantation of a foreign body.

Most of the operations were performed in modern operating theatres with well functioning ventilation systems, and the sterilisation of instruments and dressings were generally performed by acceptable methods, but there were a few distressing exceptions. For over half of the operations, no criticism could be made of the theatre or of the arrangements for sterilization.

Pre-operative skin treatment, on the other hand, was often perfunctory and with agents that have little sporicidal activity. This might have been of more significance had Ayliffe and Lowbury (1969)[2] not shown that substances with good sporicidal activity on artificially contaminated skin are less effective in destroying clostridia on the skin of patients. No doubt the repeated application of disinfectants, interspersed with vigorous scrubbing with detergents, will reduce considerably the number of clostridia on the skin over a period of 2-3 days, but total eradication is difficult to achieve and recontamination may supervene during a long operation.

Since it is almost impossible to prevent the occasional contamination with clostridia of surgical wounds of the hip or thigh, there is a strong case for giving penicillin prophylactically to all patients who undergo operations that carry a significant risk of gas gangrene. The effectiveness of penicillin as a prophylactic in these circumstances has not been established by controlled clinical trial, and the infrequency of post-operative gas gangrene would make this a difficult task, but the in-vitro sensitivity of the organism to penicillin, the results of animal experiments, and the fact that in the present investigation no patient who had received adequate prophylaxis with penicillin developed gas gangrene, suggest that it would be effective. The antibiotic of first choice is benzylpenicillin, to which all clostridia are sensitive, and a reasonable dosage would be 500,000 units six-hourly, as recommended by Taylor (1960).[3] Treatment should begin a few hours before the operation but not earlier, and should be continued for five to seven days.

The prophylactic use of antibiotics is not a practice to be recommended lightly, but the risk to the patient of ill-effects from the antibiotic are justified as an alternative to gas gangrene. No estimate has yet been made of the size of the population at special risk for serious clostridial infection. Until this has been done we shall not know how many patients need to be given penicillin for its prevention and the effect of this on the total amount of penicillin used in surgical wards.

Since the overwhelming majority of post-operative clostridial infections are sporadic and attributable to self-infection, the really effective preventive measures are those that form part of the routine management of patients at special risk. Action taken when a case appears is often ill conceived and may distract attention from what should have been done earlier. Closure of operating theatres and the extensive bacteriological sampling of surfaces and objects within it is seldom necessary. Clostridia are almost invariably isolated, but a similar result would probably have been observed if there had not been a case of gas gangrene.

Clostridial infections have repeatedly followed operations performed in well-maintained modern theatres. It is obviously undesirable that operations should be performed under poor physical conditions, which undoubtedly influence the general sepsis rate, but criticism of the operating theatre should seldom be the main response to a case of gas gangrene. Nevertheless, true outbreaks of gas gangrene due to infection acquired in the operating theatre have been described.

though none was seen in Britain during the period of the survey. After a case of post-operative gas gangrene has been diagnosed, therefore, it is always advisable to carry out an immediate inspection of the theatre and its ventilation system and to make a thorough check of the arrangements for sterilization.

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Improvement of Drug-sensitivity Tests on Tubercle Bacilli. Universal use of the standard strain H37Rv has helped considerably to achieve a degree of uniformity in sensitivity test technique and to further the concept of relating the behaviour of a test strain to the normal. However, laboratories which specialise in tuberculosis bacteriology cannot now afford its disadvantages. These are its failure to represent precisely the sensitivity of wild strains of *M. tuberculosis* to certain drugs and, where it is the sole standard, the penalty of a serious degree of experimental error. Both can be avoided by the use of the modal resistance of a group of sensitive wild strains as a reference. In Britain, faulty identification of new cases and primary resistance in wild strains are not common enough to affect the calculation of modal resistance and almost all such aberrant strains are recognisable if their exclusion is desired. In some countries a high incidence of primary resistance precludes the use of unscreened wild strains as standards but new strains found sensitive in the previous batch of tests are suitable. Constant renewal by this means avoids the risk of change during repeated subcultures and the labour of maintaining a permanent collection.

The removal of large clumps from inocula considerably lessens the error of sensitivity tests and facilitates reading. Their presence leads to over-estimation of the incidence of resistant bacilli in normal cultures and is particularly liable to result in a false diagnosis of resistance to PAS and thiacetazone. Where the resistant moiety approaches 1 per cent of the viable count, as in many Asiatic strains tested with thiacetazone, unfiltered inocula readily cause an appearance of resistance. Asiatic strains often appear to survive better than British strains on thiacetazone medium and with decay of the drug, their titration endpoints shift more noticeably. Incubation of tests must be kept to the minimum therefore if over-estimation of resistance from this cause is to be minimised. There seems no reason to suppose that this property of Asiatic strains bears on their clinical response to the drug. After three weeks' incubation the modal resistance of Asiatic strains to thiacetazone appears to be twice that of British strains but if the trend observed is extrapolated back to zero time, there is probably no difference in sensitivity between them. In general work, tests cannot be read before three weeks because some strains grow slowly. It is suggested therefore that thiacetazone tests both in Britain and Asia should use filtered inocula, a 100 colony endpoint and a three week period of incubation. Our results suggest that significant thiacetazone resistance could then be accurately diagnosed in Hong Kong on endpoints four times the modal resistance of local strains. British strains could not be used there as standards without an allowance for their different rate of endpoint shift. H37Rv, which is too sensitive for use as a British standard, is even more unsuitable in Asia.

A small proportion of naturally drug-resistant bacilli are present in sensitive strains of *M. tuberculosis*. If the proportion is observed to rise during treatment, response to the drug concerned will usually be poor even if the majority of the bacilli are then sensitive. A similar incidence of resistant bacilli in an untreated patient does not have the same significance. In the former case it is a sign that treatment is failing, in the latter case it may not impair response to a double or triple drug regime. This favourable outcome has not only been observed in relation to thiacetazone in Hong Kong but to PAS in India (Mitchison, 1968)[1] and to PAS and isoniazid with *M. bovis* (Kataria, 1969).[2] The response of some patients with primary resistance (Tripathy *et al.*, 1969)[3] and some infections with opportunist mycobacteria treated with apparently inappropriate drugs may have the same basis but further study of these examples is desirable.

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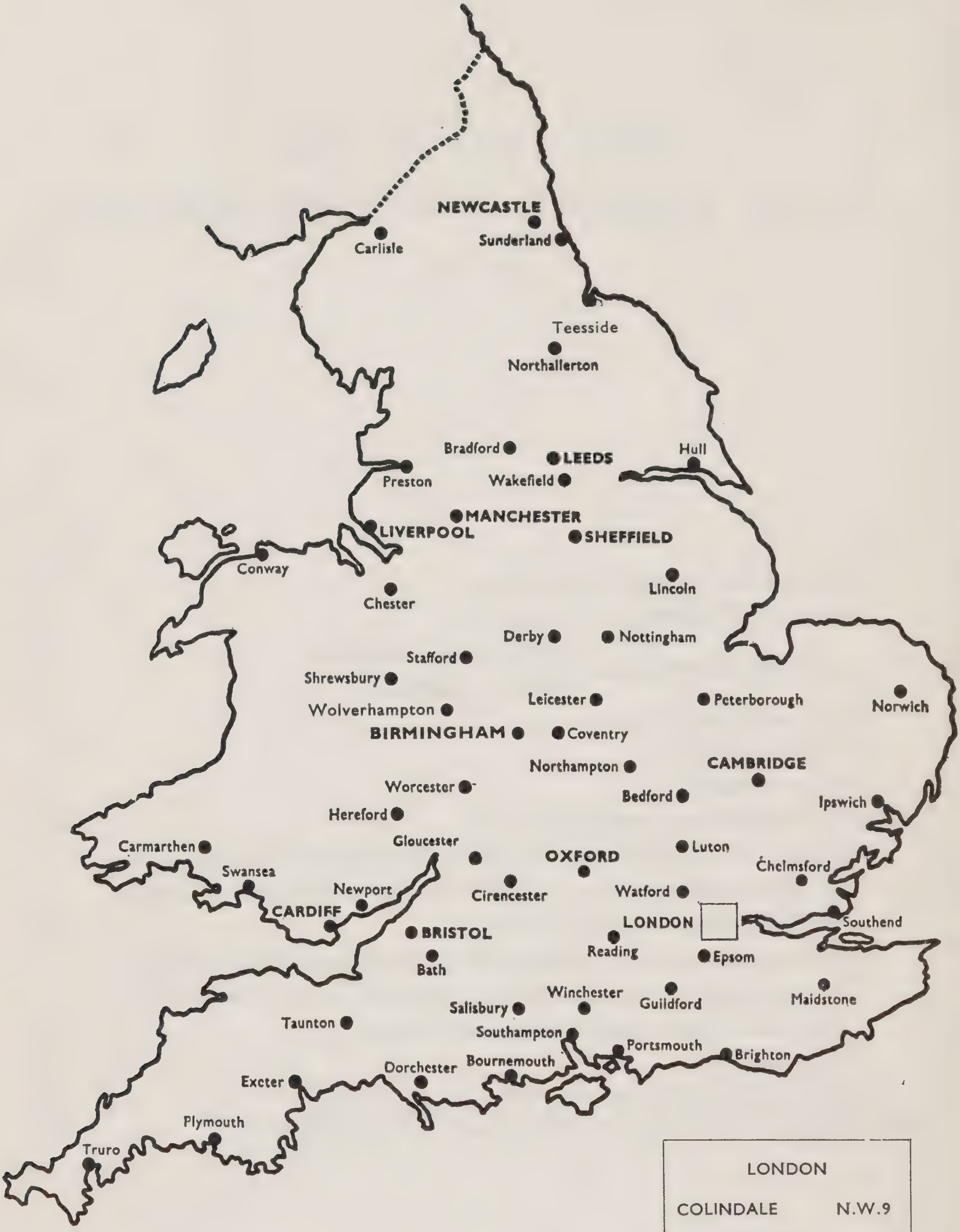

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PETERBOROUGH:

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E. J. G. Glencross, M.B., M.R.C.Path., Dip.Bact. (*Director*)
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---

* Seconded to the Jinnah Postgraduate Medical Centre, Karachi, Pakistan

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C. S. Goodwin, M.D., Dip.Bact.
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SHREWSBURY:

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A. C. Jones, M.B., M.R.C.Path. (*Director*).
P. H. Everall, F.I.M.L.T. (*Technical Officer*)

---

*Consultant Bacteriologist employed by the Manchester Regional Hospital Board (*see page* 44)

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From 1 April 1970

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J. B. Patton, F.I.M.L.T. (*Head Technician*)

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R. Brooks, F.I.M.L.T. (*Head Technician*)
Mrs. Barbara R. Ivey, M.B. (*part-time*)

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J. V. S. Pether, M.A., B.M., M.R.C.Path., D.T.M. & H., Dip.Bact. (*Acting Director*)
F. B. Greatorex, F.I.M.L.T. (*Head Technician*)
Miss Phillippa H. Trevains, B.Sc.

TEESSIDE

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R. Blowers, M.D., F.R.C.Path., M.R.C.P., Dip.Bact. (*Director*)
W. H. Bound, F.I.M.L.T. (*Head Technician*)
P. R. Mortimer, M.B., M.R.C.Path.

TRURO:

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G. I. Barrow, M.D., M.R.C.Path. Dip.Bact. (*Director*)
C. Ellis, F.I.M.L.T. (*Head Technician*)
J. C. K. Mills, M.A., M.B., Dip.Bact.

WAKEFIELD:

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L. A. Little, M.B., F.R.C.Path. Dip.Bact. (*Director*)
G. Denton, F.I.M.L.T. (*Head Technician*)
H. Fennell, B.Sc.

WATFORD:

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Tel.: Watford (STD 92) 21369
B. R. Eaton, M.B., M.R.C.Path., D.C.H. (*Director*)
Miss Hilda Taylor, F.I.M.L.T. (*Head Technician*)

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D. I. Bartlett, F.I.M.L.T (*Head Technician*)

WOLVERHAMPTON:

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*C. H. L. Howells, B.Sc., M.D., F.R.C.Path. (*Honorary Director*)
I. A. Harper, M.B., M.R.C.Path.
V. G. Kitchen, F.I.M.L.T. (*Head Technician*)

WORCESTER:

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R. J. Henderson, M.D. (*Director*)
H. R. Jenkins, F.I.M.L.T. (*Head Technician*)
M. B. Skirrow, M.B., Ph.D., M.R.C.Path., D.T.M. & H.

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*Consultant Bacteriologist employed by the Birmingham Regional Hospital Board (*see page* 44)

REFERENCE LABORATORIES

These Laboratories normally receive specimens only from other laboratories within or without the Service.

CROSS-INFECTION REFERENCE LABORATORY:

(*incorporating the Staphylococcus and Streptococcus Reference Laboratories*):

Central Public Health Laboratory,
Colindale Avenue, London, N.W.9
Tel.: 01-205 7041

M. T. Parker, M.D., F.R.C.Path., Dip.Bact. (*Director*)
Mrs. Elizabeth A. Hall Asheshov, Ph.D., M.R.C.Path., Dip.Bact.
D. C. J. Bassett, M.B., Dip.Bact.
Mrs. Brenda M. Brock, B.Sc.
A. W. Coe (*Head Technician*)
*N. Foord, B.Sc.
J. H. Hewitt, M.Sc.
*O. M. Lidwell, D.Phil. (*Deputy Director*)
Mrs. Diana R. Martin, M.Sc.
W. R. Maxted, Hon. Dr. (Leiden), M.I.Biol., F.I.M.L.T.
Mrs. Alison M. Pinney, B.Pharm.
*R. Speers, B.A., Ph.D.
Mrs. Adeline G. Towers, B.Sc., M.B., M.R.C.Path. (*part-time*)
Mrs. Jean P. Widdowson, B.Pharm., Ph.D., M.P.S.
Miss Jennifer M. Woods, B.Sc.

DISINFECTION REFERENCE LABORATORY:

Central Public Health Laboratory,
Colindale Avenue, London, N.W.9
Tel.: 01-205 7041

J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact. (*Director*)
Mrs. Isobel M. Maurer, B.Sc.

DYSENTERY REFERENCE LABORATORY:

Central Public Health Laboratory,
Colindale Avenue, London, N.W.9
Tel.: 01-205 7041

Mrs. K. Patricia Carpenter, M.B., F.R.C.Path., Dip.Bact. (*Director*)
Mrs. Jacqueline A. Howes, B.Sc.

ENTERIC REFERENCE LABORATORY:

Central Public Health Laboratory,
Colindale Avenue, London, N.W.9
Tel.: 01-205 7041

E. S. Anderson, M.D., F.R.C.Path., Dip.Bact., F.R.S. (*Director*)
J. D. H. de Sa, M.Sc., Ph.D.
F. J. Flynn (*Head Technician*)
Miss Ann H. Gilmour, B.Sc.
N. D. F. Grindley, B.A.
C. S. Heymann, M.B., M.R.C.Path., D.P.H., D.T.M.& H., Dip.Bact.
Mrs. Patricia M. Hodd, B.Sc.
Miss Eleanor E. Horsfall, B.Sc.
Miss Alison R. Hughes, B.Sc.
Miss June N. Mayhew, B.Sc.
Miss Jacqueline Payne, B.Sc.
H. R. Smith, B.A.
E. J. Threlfall, B.Sc., Ph.D.

LEPTOSPIROSIS REFERENCE LABORATORY:

London School of Hygiene and Tropical Medicine, Keppel Street,
London, WC1E 7HT
Tel.: 01-636 8636

L. H. Turner, M.B.E., M.D., D.T.M. & H. (*Director*)
R. J. Reed (*Head Technician*)

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* Members of the external scientific staff of the Medical Research Council.

MYCOLOGICAL REFERENCE LABORATORY:

London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT
Tel.: 01-636 8636

I. G. Murray, M.B., M.R.C.Path., D.T.M. & H. (*Director*)
Miss Christine M. Philpot, B.Sc.

MYCOPLASMA REFERENCE LABORATORY:

Central Public Health Laboratory, Colindale Avenue, London, N.W.9
Tel.: 01-205 7041

B. E. Andrews, M.R.C.S., F.R.C.Path., Dip.Bact. (*Director*)
R. A. Hewish, F.I.M.L.T. (*Head Technician*)
R. H. Leach, M.Sc., D.Phil. (*Deputy Director*)

SALMONELLA REFERENCE LABORATORY:

Central Public Health Laboratory, Colindale Avenue, London, N.W.9
Tel.: 01-205 7041

Mrs. Joan Taylor, M.B., B.Sc., F.R.C.Path., D.P.H. (*Director to 19 October 1970*)*
R. J. Gross, B.A.
Mrs. Mary L. M. Hall, B.Sc.
G. McGimpsey, F.I.M.L.T. (*Head Technician*)
B. Rowe, M.A., M.B., D.T.M. & H.

TUBERCULOSIS REFERENCE LABORATORY:

Institute of Preventive Medicine, The Parade, Cardiff, CF2 3UJ
Tel.: (Cardiff STD 0222) 30108

J. Marks, M.D., F.R.C.P., F.R.C.Path., Dip.Bact. (*Director*)
P. A. Jenkins, Ph.D.
J. L. Leat, B.Sc.
A. P. Mills, B.Sc.
P. J. Patterson (*Head Technician*)

VENEREAL DISEASE REFERENCE LABORATORY:

London Hospital Research Laboratories, Ashfield Street, London, E.1
Tel.: 01-790 3008

A. E. Wilkinson, M.B., F.R.C.Path., M.R.C.S. (*Director, part-time*)
Miss Nafra A. Johnston, M.D., D.R.C.O.G. (*part-time*)
G. Scrimgeour, M.B., M.R.C.Path., Dip.Bact.
A. D. Seth, M.Sc.
C. J. Storey (*Head Technician*)
Miss Christina C. Wiseman, B.Sc.

VIRUS REFERENCE LABORATORY:

Central Public Health Laboratory, Colindale Avenue, London, N.W.9
Tel.: 01-205 7041

A. D. Macrae, M.D., F.R.C.Path., Dip.Bact. (*Director*)
Miss Mary O. Adams (Mrs. Roebuck), M.B., Dip.Bact.
Mrs. Jean M. Blake, B.Sc.
Mrs. Patricia Chakraverty, B.Sc.
Miss Yvonne E. Cossart (Mrs. Wills), M.B., B.Sc., M.R.C.Path., D.C.P.
J. Craske, M.B., M.R.C.Path., Dip.Bact.
Miss Anne M. Field, B.Sc., Ph.D.
Miss Sylvia D. Gardner, M.B., M.R.C.Path., Dip.Bact.
Miss Wendy A. Knowles, B.Sc.
J. R. McDonald, F.I.M.L.T. (*Senior Technical Officer*)
Mrs. E. Valerie Meurisse, M.Sc.
Mrs. Marguerite S. Pereira, M.D. (*Deputy Director*)
Miss Hazel Ratcliffe, B.Sc.
F. G. Rogers, B.Sc.
Mrs. Elise M. Vandervelde, M.B., Dip.Bact.

Note: With the exception of smallpox and related virus diseases, rabies and the serology of typhus fever, the Virus Reference Laboratory does not receive specimens for routine diagnosis. Such specimens are received at all regional and most area laboratories and enquiries should be directed to the nearest P.H.L.S. laboratory.

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*To be succeeded by Dr. J. H. McCoy.

COMPUTER TRIALS DEPARTMENT:

Central Public Health Laboratory,
Colindale Avenue, London, N.W.9
Tel.: 01-205 7041

S. P. Lapage, M.B., M.R.C.Path., Dip.Bact. (*Director*)
M. A. Curtis, B.Sc.
W. R. Willcox, B.Sc.

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Colindale Avenue, London, N.W.9
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Mrs. Judith R. Diamond, B.Sc. (*part-time*)
W. B. Fletcher, A.M.R., F.S.S.
J. A. Lee, M.B., D.P.H.
Miss Christine L. Miller (Mrs. Manning), B.M. (*part-time*)
D. L. Miller, M.D., D.P.H. (*Deputy Director*)
Miss Hilary E. Mogford, M.Sc.
Mrs. Sheila Polakoff, M.B., D.P.H.
Miss Mair E. M. Thomas (Mrs. Livingstone), M.B., B.Sc., F.R.C.Path., D.P.H. (*part-time*)
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D. A. Woolley, F.I.M.L.T. (*Head Technician*)

FOOD HYGIENE LABORATORY:

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R. J. Gilbert, M.Pharm., Ph.D., Dip.Bact., M.P.S.
Miss Margaret Kendall, F.I.M.L.T. (*Head Technician*)
Miss Diane Roberts, B.Sc.

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Colindale Avenue, London, N.W.9
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P. J. Fisher (*Head Technician*)
L. R. Hill, M.Sc., M.I.Biol. (*Deputy Curator*)
R. J. Owen, B.Sc.
K. D. Phillips, B.Sc.
P. Thillainathan, L.M.S. (Cey.), M.R.C.Path., D.Path., Dip.Bact.

STANDARDS LABORATORY FOR SEROLOGICAL REAGENTS:

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Colindale Avenue, London, N.W.9
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Miss E. Margaret Bailey, B.Sc.
Mrs. Mabel W. Dighero, B.Sc.
Mrs. Joan M. B. Edwards, M.B., M.R.C.Path. (*Deputy Director, part-time*)
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J. Foreman, F.I.M.L.T. (*Head Technician*)
A. Ghaffer, B.Sc.
Miss Agnes J. Tannahill, B.Sc.

JUNIOR BACTERIOLOGISTS IN TRAINING

(*Attending course at the London School of Hygiene and Tropical Medicine for Diploma in Bacteriology*)

1969-70

N. J. Mitchell, M.B., M.R.C.S.   R. Wiseman, M.B.

1970-71

G. E. Rich, M.B.   A. M. R. Mackenzie, B.A., B.M., B.Sc., M.R.C.Path.

(*Attending course at the University of Manchester for Diploma in Bacteriology*)

1969-70

Miss Margaret E. Macaulay, M.B.

STAFF ON SECONDMENT

J. Craske, M.B., M.R.C.Path., Dip.Bact. (*to Department of Virology and Epidemiology, Baylor University College of Medicine, Houston, Texas U.S.A.*)

T. T. Donovan, F.I.M.L.T. (*to Jinnah Postgraduate Medical Centre, Karachi, Pakistan*)

T. N. Stanbridge, M.B., M.R.C.S., Dip.Bact. (*to University of Manchester*)

HOSPITAL PATHOLOGICAL LABORATORIES DESIGNATED "RECOGNISED"

at which arrangements are made for the examination of public health specimens for the Service

AYLESBURY
Stoke Mandeville Hospital, Aylesbury, Buckinghamshire.
BOLTON
Royal Infirmary, Bolton, Lancashire.
WIGAN
Royal Infirmary, Wigan, Lancashire.

Consultant Bacteriologists employed by Regional Hospital Boards in the Hospital Service, who are associated on a part-time or honorary basis with the Public Health Laboratory Service

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Tel.: 021-772 4021.

T. H. FLEWETT, M.D., F.R.C.Path.
Regional Virus Laboratory, East Birmingham Hospital, Bordesley Green East, Birmingham, 9.
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REFERENCE EXPERTS

In the following list the name of the expert who is responsible for the relevant examination is given. Reference experts normally receive specimens only from other laboratories within and without the Service. It should be added, however, that all regional and most area laboratories are undertaking the routine diagnosis of virus infections, and that several laboratories are undertaking the serological identification of members of the *Salmonella* group, the serological diagnosis of leptospiral infections, and the bacteriophage-typing of strains of *Staphylococcus aureus*. For this reason enquiries on these subjects should usually be addressed to the local public health laboratory.

Amoebiasis, diagnosis of

A. L. Jeanes, M.D., M.R.C.Path., Department of Clinical Pathology, Guy's Hospital, London, S.E.1. *Tel.:* 01-407 7600.

Anaerobes, identification
A. T. Willis, M.D., Ph.D., M.R.A.C.P., M.R.C.Path., Public Health Laboratory, Luton and Dunstable Hospital, Lewsey Road, Luton.
Tel.: Luton (STD 0582) 52007.

Anthrax bacilli, identification
Miss Joan R. Davies, M.D., Dip.Bact., Bacteriological Laboratory (P.H.L.S.), Room 617, County Hall, London, S.E.1.
Tel.: 01-928 3467.

Anthrax, examination under Wool and Hair Regulations
T. F. Elias-Jones, M.B., F.R.C.Path., The City Laboratory, 23 Montrose Street, Glasgow, C.I. *Tel.:* 041-221 9600 and 4348, *Ext.* 2400.

H. G. M. Smith, M.B., Ph.D., Dip.Bact., Public Health Laboratory, 16–18 Edmund Street, Bradford, 5. *Tel.:* Bradford (STD 0274) 24314.

Miss Joan R. Davies, M.D., Dip.Bact., Bacteriological Laboratory (P.H.L.S.), Room 617, County Hall, London, S.E.1.
Tel.: 01-928 3467.

G. C. Turner, M.D., F.R.C.Path., Public Health Laboratory, 126 Mount Pleasant, Liverpool, L3 5SU. *Tel.:* 051-709 3636.

Arboviruses
J. S. Porterfield, M.D., M.R.C.S., L.R.C.P., National Institute for Medical Research, Mill Hill, London, N.W.7. *Tel.:* 01-959 3666.

Arizona group, identification
Mrs. Joan Taylor, M.B., B.Sc., F.R.C.Path., D.P.H., Salmonella Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Brucella, identification

D. J. H. Payne, M.B., F.R.C.Path., Dip.Bact., Public Health Laboratory, St. Mary's General Hospital, East Wing, Milton Road, Portsmouth, PO3 6AQ. *Tel.:* Portsmouth (STD 0705) 22331.

Cholera and related vibrios, identification

Mrs. K. Patricia Carpenter, M.B., F.R.C.Path., Dip.Bact., Dysentery Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Clostridium welchii, serological typing

Miss Betty C. Hobbs, O.St.J., D.Sc., F.R.C.Path., Dip.Bact., Food Hygiene Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9.
Tel.: 01-205 7041.

Coxsackie A viruses

D. R. Gamble, M.B., M.R.C.Path., Dip.Bact., Public Health Laboratory, West Park Hospital, Epsom. *Tel.:* 01-39 26633.

Cytomegaloviruses

H. Stern, M.B., Ph.D., M.R.C.Path., Virus Department, St. George's Hospital Medical School, Hyde Park Corner, London, S.W.1.
Tel.: 01-235 4343, *Ext.* 147.

Regional Centres for Cytomegaloviruses Complement Fixation Tests

Bristol: Suzanne K. R. Clarke, M.D., M.R.C.Path., Public Health Laboratory, Myrtle Road, Kingsdown, Bristol, BS2 8EL. *Tel.:* Bristol (STD 0272) 21326.

Leeds: M. H. Hambling, M.D., M.R.C.Path., D.(Obst.)R.C.O.G., Dip.Bact., Public Health Laboratory, Bridle Path, York Road, Leeds, LS15 7TR.
Tel.: Leeds (STD 0532) 645011.

Manchester: J. O'H. Tobin, B.M., M.R.C.Path., Dp.Bact., Public Health Laboratory, Withington Hospital, Manchester, M20 8LR.
Tel.: 061-445 2416.

P. J. L. Sequiera, M.B., The Central Serology Laboratory, Withington Hospital, Manchester, M20 8LR. *Tel.:* 061-445 7683.

Virus Reference Laboratory: Sylvia D. Gardner, M.B., M.R.C.Path., Dip.Bact., Virus Reference Laboratory, Colindale Avenue, London, N.W.9.
Tel.: 01-205 7041.

Diphtheria bacilli, identification

W. H. H. Jebb, M.D., F.R.C.Path., Public Health Laboratory, Radcliffe Infirmary, Oxford, OX2 6AH. *Tel.:* Oxford (STD 0865) 49231/2.

Disinfection

J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact., Disinfection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Drug Resistance in Enterobacteria

E. S. Anderson, M.D., F.R.C.Path., Dip.Bact., F.R.S., Enteric Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Dysentery bacilli, typing

Mrs. K. Patricia Carpenter, M.B., F.R.C.Path., Dip.Bact., Dysentery Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Enteric Fever

(*a*) Serological investigation of suspected cases and carriers.
(*b*) Phage-type and ecological study of strains of typhoid and paratyphoid bacilli, and of *Salmonella typhimurium* and certain other salmonella serotypes.

E. S. Anderson, M.D., F.R.C.Path., Dip.Bact., F.R.S., Enteric Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Entomological specimens, investigation

B. R. Laurence, Ph.D., Department of Entomology, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT
Tel.: 01-636 8636.

Escherichia coli, typing

Mrs. Joan Taylor, M.B., B.Sc., F.R.C.Path., D.P.H., Salmonella Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Farmer's lung, serological diagnosis

I. G. Murray, M.B., M.R.C.Path., D.T.M. & H., Mycological Reference Laboratory, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT *Tel.:* 01-636 8636.

D. G. Davies, M.D., F.R.C.Path., Dip.Bact., Public Health Laboratory, Cumberland Infirmary, Carlisle. *Tel.:* Carlisle (STD 0228) 23654

J. E. Jameson, M.R.C.S., Public Health Laboratory, Royal Sussex County Hospital, Brighton, 7, BN2 5BE. *Tel.:* Brighton (STD 0273) 63506.

B. Moore, M.D., B.Sc., F.R.C.Path., B.A.O., Public Health Laboratory, Church Lane, Heavitree, Exeter. *Tel.:* Exeter (STD 0392) 77833.

H. D. S. Morgan, M.R.C.S., F.R.C.Path., Dip.Bact., Public Health Laboratory West Wales General Hospital, Glangwili, Carmarthen.
Tel.: Carmarthen (STD 0267) 7271.

M. Sussman, Ph.D., M.I.Biol., The Welsh National School of Medicine, Department of Bacteriology, The Royal Infirmary, Cardiff, CF2 1SZ.
Tel.: Cardiff (STD 0222) 33101.

D. M. Weir, M.D., Immunology Unit, Department of Bacteriology, Edinburgh University Medical School, Teviot Place, Edinburgh.
Tel.: 031-667 1011, *Ext.* 2256.

*Food Poisoning**

Miss Betty C. Hobbs, O.St.J., D.Sc., F.R.C.Path., Dip.Bact., Food Hygiene Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Fungi (pathogenic), identification

I. G. Murray, M.B., M.R.C.Path., D.T.M.&H., Mycological Reference Laboratory, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT *Tel.:* 01-636 8636.

Helminthological specimens, investigation

Professor G. S. Nelson, M.D., D.Sc., D.T.M.&H., D.A.P.&E., London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT *Tel.:* 01-636 8636.

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* Owing to the perishable nature of most foodstuffs, material for investigation from outbreaks of food poisoning should normally be sent to the nearest public health laboratory. The reference laboratory should be used mainly for non-perishable articles of food, especially when litigation may arise, and for the identification of strains.

Hydatid disease, complement-fixation test for

Mrs. C. M. Patricia Bradstreet, M.B., M.R.C.Path., Dip.Bact., Standards Laboratory for Serological Reagents, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Immunofluorescence

C. E. D. Taylor, M.A., M.D., M.R.C.Path., Dip.Bact., Central Middlesex Hospital, Park Royal, London, N.W.10. *Tel.:* 01-965 5733.

Influenza

L. Hoyle, M.B., Public Health Laboratory, General Hospital, Northampton, NN1 5BD. *Tel.:* Northampton (STD 0604) 34347.

Mrs. Marguerite S. Pereira, M.D., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9.
Tel.: 01-205 7041.

Listeria typing

Miss Agnes J. Tannahill, B.Sc., Standards Laboratory for Serological Reagents, Central Public Health Laboratory, Colindale Avenue, London, N.W.9.
Tel.: 01-205 7041.

Malaria parasites and other blood protozoa

Professor P. C. C. Garnham, C.M.G., M.D., D.Sc., F.R.S., Imperial College Field Station, Ashurst Lodge, Ascot, Berkshire.
Tel.: Ascot (STD 0990) 22204.

Meningococci, typing

Mrs. C. M. Patricia Bradstreet, M.B., M.R.C.Path., Dip.Bact., Standards Laboratory for Serological Reagents, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Parasitic infections, serological diagnosis of
D. S. Ridley, B.Sc., M.D., F.R.C.Path., Department of Pathology, Hospital for Tropical Diseases, 4 St. Pancras Way, London, N.W.1.
Tel.: 01-387 4411.

Pasteurella pseudotuberculosis
N. S. Mair, M.B., F.R.C.Path., D.C.H., D.P.H., Dip.Bact., Public Health Laboratory, Groby Road Hospital, Leicester, LE3 9QE.
Tel.: Leicester (STD 0533) 872283.

Plague, investigation
R. J. Henderson, M.D., Public Health Laboratory, Royal Infirmary, Castle Street Branch, Worcester. *Tel.:* Worcester (STD 0905) 25238/9.

Pneumococci, typing of, from epidemics
M. T. Parker, M.D., F.R.C.Path., Dip.Bact., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Poliomyelitis, marker tests
Miss Yvonne E. Cossart, M.B., B.Sc., M.R.C.Path., D.C.P., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Protective cabinets
O. M. Lidwell, D.Phil., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9.
Tel.: 01-205 7041.

Protozoological specimens, investigation
Professor W. H. R. Lumsden, D.Sc., M.B., M.R.C.P.E., D.T.M., D.T.H., F.R.S.E., Department of Medical Protozoology, London School of Hygiene and Tropical Medicine, Keppel Street, London WC1E 7HT. *Tel.:* 01-636 8636.

Psittacosis, isolation of causative agent
Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-052 7041.

Rabies, laboratory tests for diagnosis
A. D. Macrae, M.D., F.R.C.Path., Dip.Bact., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9.
Tel.: 01-205 7041.

Rickettsia
A. D. Evans, M.B., B.Sc., M.R.C.Path., Dip.Bact., Public Health Laboratory, Institute of Pathology, 3rd Floor, Royal Infirmary, Cardiff, CF2 1SZ.
Tel.: Cardiff (STD 0222) 33101.

Salmonella organisms, typing
Mrs. Joan Taylor, M.B., B.Sc., F.R.C.Path., D.P.H., Salmonella Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Smallpox, laboratory tests for diagnosis
Birmingham: H. S. Bedson, M.D., M.R.C.P.,
Professor N. P. L. Wildy, M.B., M.R.C.S., F.R.S.E.,
Department of Virology and Bacteriology, The University, Birmingham, 15.
Tel.: 021-472 1301. *Night extension:* (STD 021-472) 3524.

Bristol: Miss Suzanne K. R. Clarke, M.D., M.R.C.Path., Public Health Laboratory, Myrtle Road, Kingsdown, Bristol, BS2 8EL.
Tel.: Bristol (STD 0272) 21326.

Cardiff: A. D. Evans, M.B., B.Sc., M.R.C.Path., Dip. Bact., Public Health Laboratory, Institute of Pathology, 3rd Floor, Royal Infirmary, Cardiff, CF2 1SZ. *Tel.:* Cardiff (STD 0222) 33101.

Leeds: M. H. Hambling, M.D., M.R.C.Path., D.(Obst.)R.C.O.G., Dip. Bact., Public Health Laboratory, Bridle Path, York Road, Leeds, LS15 7TR.
Tel.: Leeds (STD 0532) 645011.

Liverpool: Professor K. McCarthy, M.D., M.R.C.Path., Department of Medical Microbiology, New Medical School, Ashton Street, P.O. Box 147, Liverpool, L69 3BX.

London: A. D. Macrae, M.D., F.R.C.Path., Dip. Bact., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Newcastle: J. H. Hale, O.B.E., M.D., F.R.C.Path., M.R.C.P., Public Health Laboratory, Institute of Pathology, General Hospital, Westgate Road, Newcastle upon Tyne, NE4 6BE.
Tel.: Newcastle (STD 0632) 38811, *Ext.* 297.

Staphylococci, bacteriophage-typing

M. T. Parker, M.D., F.R.C.Path., Dip.Bact., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Streptococci of Group A, typing

M. T. Parker, M.D., F.R.C.Path., Dip.Bact., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

Regional Typing Laboratories

(i) *Northern and South Eastern counties:* Cumberland, Co. Durham, Lancs., Northumberland, Westmorland, Yorks, Dorset, Hants., Kent, London, Surrey, Sussex.

M. T. Parker, M.D., F.R.C.Path., Dip.Bact., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

(ii) *Eastern Counties:* Beds., Cambs., Derby, Essex, Herts., Hunts., Leics., Lincs., Norfolk, Northants., Notts., Rutland, Suffolk.

Miss Joan M. Boissard, M.R.C.S., Public Health Laboratory, Tennis Court Road, Cambridge. *Tel.:* Cambridge (STD 0223) 55526 and 57573.

(iii) *Western Counties:* Berks., Bucks., Cheshire, Cornwall, Devon, Glos., Heref., Oxon., Salop., Somerset, Staffs. Warw., Wilts., Worcs.

W. H. H. Jebb, M.D., F.R.C.Path., Public Health Laboratory, Radcliffe Infirmary, Oxford, OX2 6AH. *Tel.:* Oxford (STD 0865) 49231/2.

(iv) *Wales.*

Professor Scott Thomson, M.D., F.R.C.P.E., F.R.C.Path., D.P.H., Public Health Laboratory, Institute of Pathology, 3rd Floor, Royal Infirmary, Cardiff, CF2 1SZ. *Tel.:* Cardiff (STD 0222) 33101.

Toxoplasmosis

North

G. B. Ludlam, M.D., F.R.C.Path., D.T.M. & H., D.L.O., Public Health Laboratory, Bridle Path, York Road, Leeds, LS15 7TR
Tel.: Leeds (STD 0532) 645011.

South (excluding London)

W. Kwantes, M.A., M.B., F.R.C.Path., Dip.Bact., Public Health Laboratory, Cockett Road, Swansea, SA2 0FA. *Tel.:* Swansea (STD 0792) 24041.

London

D. G. Fleck, M.D., M.R.C.Path., Dip.Bact., Public Health Laboratory, St. George's Hospital, Tooting Grove, London, S.W.17.
Tel.: 01-672 1255.

Trichinosis, examination of rats and pigs

Professor G. S. Nelson, M.D., D.Sc., D.T.M.&H., D.A.P. & E., London School of Hygiene & Tropical Medicine, Keppel Street, London, WC1E 7HT *Tel.:* 01-636 8636.

Tubercle bacilli and other mycobacteria

J. Marks, M.D., F.R.C.P., F.R.C.Path., Dip.Bact., Tuberculosis Reference Laboratory, Institute of Preventive Medicine, The Parade, Cardiff, CF2 3UJ. *Tel.:* Cardiff (STD 0222) 30108.

Regional Centres for Tuberculosis Bacteriology

Birmingham: F. A. J. Bridgwater, M.B., M.R.C.Path., Dip. Bact., East Birmingham Hospital, Bordesley Green East, Birmingham, 9.
Tel.: 021-772 4021.

Bristol: H. R. Cayton, M.B., M.R.C.Path., Public Health Laboratory, Myrtle Road, Kingsdown Bristol, BS2 8EL. *Tel.:* Bristol (STD 0272) 21326.

Liverpool: G. C. Turner, M.D., F.R.C.Path., Public Health Laboratory, 126 Mount Pleasant, Liverpool, L3 5SU.
Tel.: 051-709 3636/7.

London: C. H. Collins, M.I.Biol., F.I.M.L.T., Bacteriological Laboratory (P.H.L.S.), Room 617, County Hall, Westminster Bridge, London, S.E.1.
Tel.: 01-928 3467.

Manchester: J. D. Abbott, M.D., M.R.C.Path., Dip.Bact., Public Health Laboratory, Withington Hospital, Manchester, M20 8LR.
Tel.: 061-445 2416.

Newcastle: J. B. Selkon, M.B., M.R.C.Path., D.C.P., Public Health Laboratory, Institute of Pathology, General Hospital, Westgate Road, Newcastle upon Tyne, NE4 6BE. *Tel.:* Newcastle (STD 0632) 38811, *Ext.* 297.

Wakefield: L. A. Little, M.B., F.R.C.Path., Dip.Bact., Public Health Laboratory, Wood Street, Wakefield. *Tel.:* Wakefield (STD 0924) 76961.

Typhus fever, serological tests*

Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* 01-205 7041.

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* The Weil-Felix test can be carried out in all constituent laboratories of the Service, and also in a number of hospital laboratories. Only sera giving a doubtful reaction should be sent to the Virus Reference Laboratory.

Venereal diseases, Treponemal immobilisation test

A. E. Wilkinson, M.B., F.R.C.Path., M.R.C.S., Venereal Diseases Reference Laboratory, London Hospital Research Laboratories, Ashfield Street, London, E.1. *Tel.:* 01-790 3008.

Midlands

P. J. L. Sequiera, M.B., The Central Serology Laboratory, Withington Hospital, West Didsbury, Manchester, 20.
Tel.: Manchester (STD 061-445) 7683.

North

J. H. Hale, O.B.E., M.D., F.R.C.Path., M.R.C.P., Public Health Laboratory, Institute of Pathology, General Hospital, Westgate Road, Newcastle upon Tyne, NE4 6BE. *Tel.:* Newcastle (STD 0632) 38811, *Ext.* 297.

VACCINES AND OTHER IMMUNOLOGICAL MATERIALS OBTAINABLE THROUGH THE PUBLIC HEALTH LABORATORY SERVICE

For the address of P.H.L.S. laboratories *see* pp. 26–35

Typhus Vaccine

Stocks are held by the P.H.L.S. laboratories at:

Birmingham
Bristol
Cambridge
Exeter
Leeds
Liverpool
London (Colindale)
Manchester
Newcastle
Oxford
Sheffield
Cardiff (a)

Rabies Vaccine

Stocks are held by the P.H.L.S. laboratories at:

Liverpool
London (Colindale)
Newcastle
Cardiff (a)

Anthrax Vaccine

Stocks are held by the P.H.L.S. laboratories at:

Bradford
Liverpool
London (Colindale)

Human immunoglobulin

Immunoglobulin prepared from the pooled plasma of normal healthy adults is obtainable on request from any laboratory of the Service. So far as supplies allow, it is issued for the protection of women in contact with rubella during the first three months of pregnancy. It is also issued for contacts of measles and infectious hepatitis in circumstances of special risk.

In addition to normal human immunoglobulin, a stock of immunoglobulin prepared from the blood of persons recently vaccinated against smallpox is held for the treatment of cases of generalised vaccinia, eczema, vaccinatum, accidental vaccinial infections endangering the eye, and, in special circumstances, for the protection of unvaccinated smallpox contacts. This anti-vaccinial human immunoglobulin may be obtained from the P.H.L.S. laboratories at:

Birmingham
Bristol
Cambridge
Cardiff (a)
Gloucester
Leeds
Leicester
Liverpool
London (Colindale)
Manchester
Newcastle
Oxford
Sheffield

Material for intradermal diagnostic tests

Frei antigen for Lymphogranuloma inguinale, Brucellin for Undulant fever, Trichina antigen for Trichinosis, Hydatid antigen for Hydatid disease, and cat-scratch fever antigen can be obtained from the P.H.L.S. Standards Laboratory, which also issues, to any pathologist, Kveim antigen for sarcoidosis. Enquiries relating to fungal antigens should be addressed to the P.H.L.S. Mycology Reference Laboratory.

Notes on other immunological materials NOT obtainable through the Public Health Laboratory Service:

1. *Antisera for therapeutic use*

Obtainable through the Hospital Pathological Service (see appendix to HM (67)38) from which the list below is abstracted:

(a) anthrax antiserum
(b) botulinum antitoxin
(c) human antitetanus immunoglobulin
(d) ovine antitetanus serum

Note: L = Pathology Laboratory P = Pharmacy

Region 1

L	Carlisle, Cumberland Infirmary	abcd
P	Newcastle, General Hospital	abcd
	Catterick, O.C. Military Hospital	c

Region 2

L	Hull, Castle Hill Hospital	abcd
P	Leeds, Seacroft Hospital	abcd

Region 3

P	Nottingham, City Hospital	abcd

Region 4

	Cambridge, Regional Transfusion Centre	abcd

Region 5

P	London, N.7, Royal Northern Hospital	a
P	Edgware, General Hospital	bcd

Region 6

L	London, N.18, North Middlesex Hospital	abcd
	Colchester, O.C. Military Hospital	c

Region 7

	Southborough, S.E. Depot, Blood Transfusion Centre	abcd

Region 8

	Sutton, South London Transfusion Centre	abcd
	Aldershot, O.C. Cambridge Military Hospital	c

Region 9

L	Northampton, General Hospital	abcd
P	Reading, Royal Berks Hospital	abcd
P	Oxford, Churchill Hospital	c

Region 10

P	Bristol, Ham Green Hospital	abcd
L	Exeter, Royal Devon and Exeter Hospital	abcd
	Plymouth, Hospital Secretary, Scott Hospital	abcd
P	Truro, Royal Cornwall Hospital, Treliske Branch	abcd

Region 11

P	Cardiff, Royal Infirmary	abcd
L	Bangor, Caernarvon and Anglesey General Hospital	abcd
P	Wrexham, Maelor General Hospital	abcd
	Swansea, Med. Supt., Swansea Hospital	ab
P	Carmarthen, West Wales General Hospital	bcd
P	Aberystwyth, Bronglais District General Hospital	bcd

Region 12

P	Shrewsbury, Royal Salop Infirmary	acd
P	Birmingham 29, Selly Oak Hospital	abcd
P	Stoke-on-Trent, North Staffs Royal Infirmary	acd

Region 13

P	Manchester, Royal Infirmary	abcd

Region 14

P	Liverpool 9, Fazakerley Hospital	abcd

Region 15

P	Southampton, Royal South Hants Hospital	abcd
P	Salisbury,Odstock Hospital	a
	Salisbury, Accident Department, General Hospital	cd
P	Weymouth, West Haven Hospital	a
	Dorchester, Public Health Laboratory	cd
P	Portsmouth, Royal Portsmouth Hospital	cd

2. *Yellow fever inoculation*
   A list of centres can be obtained from the Department of Health and Social Security, Alexander Fleming House, Elephant and Castle, London, S.E.1.

3. *TABC, cholera and other vaccines*
   Most of these are available commercially.

4. *Smallpox Vaccine*
   Obtainable from Public Health Departments of Local Authorities (Counties, County Boroughs and London Boroughs).

APPENDIX I

COMMITTEES AND WORKING PARTIES

Food Investigation

Chairman and Secretary: J. H. McCoy, M.B., D.P.H.

E.S. Anderson, M.D., F.R.C.Path., Dip.Bact., F.R.S.
R. W. S. Harvey, M.D., M.R.C.Path., Dip.Bact.
Miss Betty C. Hobbs, D.Sc., F.R.C.Path., Dip.Bact.
W. Kwantes, M.A., M.B., F.R.C.Path., Dip.Bact.
H. D. S. Morgan, M.R.C.S., F.R.C.Path., Dip.Bact.
H. G. M. Smith, M.B., Ph.D., Dip.Bact.
Mrs. Joan Taylor, M.B., B.Sc., F.R.C.Path., D.P.H.
S. Brightwell, M.Sc., D.I.C., A.R.I.C. (*Messrs. J. Sainsbury, Ltd., to give technical advice on trade matters*)
M. Ingram, M.A., Ph.D. (*Meat Research Institute*)

Steering Committee on Antibiotic Resistance of Pathogens

Chairman: M. T. Parker, M.D., F.R.C.Path., Dip.Bact.
Secretary: A. L. Furniss, M.D., Dip.Bact.

J. D. Abbott, M.D., M.R.C.Path., Dip.Bact.,
E.S. Anderson, M.D., F.R.C.Path., Dip.Bact., F.R.S.
Mrs. K. Patricia Carpenter, M.B., F.R.C.Path., Dip.Bact.
J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact.
T. M. Pollock, M.B., M.R.C.P.(Glasg.)
Mrs. Joan Taylor, M.B., B.Sc., F.R.C.Path., D.P.H.
A. E. Wright, M.D., M.R.C.Path., D.P.H., Dip.Bact.

Standing Committee on Bacteriological Examination of Water Supplies

Chairman: W. H. H. Jebb, M.D., F.R.C.Path.
Secretary: L. A. Little, M.B., F.R.C.Path., Dip.Bact.

G. I. Barrow, M.D., M.R.C.Path., Dip.Bact.
P. B. Crone, M.D., Dip.Bact.
R. D. Gray, M.D., F.R.C.Path., D.P.H.
J. E. Jameson, M.R.C.S.
J. H. McCoy, M.B., D.P.H.
B. Moore, M.D., B.Sc., F.R.C.Path., B.A.O.
R. Pilsworth, M.D., Dip.Bact.
J. A. Rycroft, M.B., M.R.C.Path., Dip.Bact.
A. J. Kingsley Smith, B.M., M.R.C.Path.
Miss Joan M. Watkinson, B.Sc.
R. G. Allen, B.Sc., Ph.D., F.Inst.P. (*Water Research Association*)
F.W. Bunting, M.B.E., M.D., D.P.H. (*Society of Medical Officers of Health*)
N. P. Burman, B.Sc., Ph.D. (*Metropolitan Water Board*)
G. U. Houghton, Ph.D., F.R.I.C. (*South Essex Waterworks Company*)
A. E. Martin, M.D., D.P.H. (*Department of Health and Social Security*)
E. Windle-Taylor, C.B.E., M.A., M.D., F.R.C.Path., D.P.H. (*Metropolitan Water Board*)

Joint Public Health Laboratory Service/Animal Health Division Standing Advisory Committee

P.H.L.S. Members

E. S. Anderson, M.D., F.R.C.Path., Dip.Bact., F.R.S.
J. H. McCoy, M.B., D.P.H.
D. J. H. Payne, M.B., F.R.C.Path., Dip.Bact.

Veterinary Members

A. C. L. Brown, M.R.C.V.S.
M. L. Burdin, O.B.E., B.Sc., M.R.C.V.S.
A. J. Stevens, M.A., B.V.Sc., M.R.C.V.S., Dip.Bact.

Advisory Sub-Committee on Application and Report Forms

Chairman: G. T. Cook, M.D., F.R.C.Path.
Secretary: R. Pilsworth, M.D., Dip.Bact.

Standing Committee on Laboratory Buildings

Chairman: S. T. Cowan, M.D., D.Sc., F.R.C.Path., Dip.Bact.
Secretary: R. H. Westlake

Advisory Sub-Committee on Laboratory Supplies

Chairman: Miss Joan R. Davies, M.D., Dip.Bact.
Secretary: A. Waltho

Library Advisory Committee

Joint Chairmen:
B. Moore, M.D., B.Sc., F.R.C.Path., B.A.O.
Miss Betty H. Whyte, M.A., A.L.A.
Secretary: Miss Betty H. Whyte, M.A., A.L.A.

Standing Committee on Office Equipment and Methods

Chairman: J. H. Hale, O.B.E., M.D., F.R.C.Path., M.R.C.P.
Secretary: A. Waltho

Standing Committee on Technicians

Chairman: R. J. Henderson, M.D.
Secretary: J. W. Bushell

Working Party on Rubella

Chairman: A. D. Macrae, M.D., F.R.C.Path., Dip.Bact.
Secretary: D. Reid, M.B., D.P.H.

Mrs. C. M. Patricia Bradstreet, M.B., M.R.C.Path., Dip.Bact.
Miss Suzanne K. R. Clarke, M.D., M.R.C.Path.
Miss Anne M. Field, Ph.D.
J. H. Hale, O.B.E., M.D., F.R.C.Path., M.R.C.P.
M. H. Hambling, M.D., M.R.C.Path., D.(Obst.) R.C.O.G., Dip.Bact.
D. N. Hutchinson, M.D., Dip.Bact.
W. F. Lane, M.B., M.Sc., F.R.C.Path., D.P.H.
Miss Christine L. Miller, B.M.
H. D. S. Morgan, M.R.C.S., F.R.C.Path., Dip.Bact.
Mrs. Elise M. Vandevelde, M.B., Dip.Bact.
G. B. B. White, M.R.C.S., M.R.C.Path., Dip.Bact.
J. E. M. Whitehead, M.B., M.R.C.Path., Dip.Bact.

Communicable Disease Report Working Party

Chairman: T. M. Pollock, M.B., M.R.C.P. (Glasg.)
Secretary: Mrs. Enid D. Vernon, B.Sc.

H. R. Cayton, M.B., M.R.C.Path.
Miss Lynette M. Dowsett, M.D., F.R.C.Path.
W. B. Fletcher, A.M.R., F.S.S.
M. H. Hughes, D.M., M.R.C.Path., D.T.M.&H., Dip.Bact.
J. C. Kelsey, M.D., F.R.C.Path., Dip.Bact.
G. J. G. King, M.B., F.R.C.Path., Dip.Bact.
S. P. Lapage, M.B., M.R.C.Path., Dip.Bact.
D. L. Miller, M.D., D.P.H.
E. R. Mitchell, M.B., M.R,C.Path., Dip.Bact.
B. Moore, M.D., B.Sc., F.R.C.Path., B.A.O.
Professor Scott Thomson, M.D., F.R.C.P.E., F.R.C.Path., D.P.H.
J. O'H. Tobin, B.M., M.R.C.Path., Dp.Bact.
R. H. Westlake
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Working Party on Epidemic Non-Bacterial Gastro-Enteritis

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(Working in collaboration with the Medical Research Council Working Party)

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APPENDIX II

PUBLICATIONS BY MEMBERS OF THE STAFF OF THE PUBLIC HEALTH LABORATORY SERVICE DURING 1969

Besides the specific items mentioned below, there are many publications to which the work of the Service has contributed. The internationally recognised reference laboratories and the Epidemiological Research Laboratory submit figures regularly to W.H.O. for inclusion in their statistical periodicals. Again, the giving of specialist help and advice and the supply of serological reagents are among the functions of the Service, and in the course of the year a number of papers have acknowledged such contributory work by members of the staff. Other unlisted material includes leading articles, unsigned annotations, conference papers which remain unpublished, book reviews, contributions to the various abstracting journals, and notes compiled from the Service's weekly Communicable Disease Report which appear regularly in the Brit. med. J. *and elsewhere.*

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APPENDIX III

AWARDS AND EXTERNAL OFFICES ACCEPTED BY MEMBERS OF THE SERVICE DURING 1969

Sir James Howie	Doctor of Laws, University of Aberdeen; Honorary Consultant Adviser on Bacteriology, Department of Health and Social Security; Chairman of the Sterilisation Advisory Group, Department of Health and Social Security.
Dr. R. Blowers	Assistant Editor, Journal of Medical Microbiology; Secretary, Medical Research Council Hospital Infection Committee.
Mr. R. Brooks	Member of the Medical Laboratory Technicians Board, Professions Supplementary to Medicine; Member of the Science Advisory Panel, Welsh Joint Education Committee.
Dr. P. B. Crone	President, Northern Branch of the Society of Medical Officers of Health.
Dr. E. H. Gillespie	Honorary Secretary of the Group Medical Advisory Committee, Sheffield No. 1 Hospital Management Committee; Member of the Scientific Advisory Board, Sheffield Polytechnic.
Dr. J. V. T. Gostling	Assistant Editor, British Journal of Experimental Pathology.
Mr. R. Harper	Member of the Council of the Institute of the Medical Laboratory Technology; Member of the Pharmacy Advisory Committee, Liverpool College of Technology.
Dr. J. G. P. Hutchison	Member of the Birmingham Regional Advisory Committee on Pathology.
Dr. S. P. Lapage	Member of the Committee of the Society of Applied Bacteriology; Member of the Microbiology Sub-Group of the Laboratory Equipment and Methods Advisory Group, Department of Health and Social Security; Member of the Laboratory Automation Trials Group, Department of Health and Social Security.
Dr. J. H. McCoy	Member of the Joint FAO/WHO Expert Committee on Milk Hygiene.
Dr. A. D. Macrae	Member of the Virus Group Committee, Society for General Microbiology.
Dr. J. Marks	Secretary of the Cardiff Postgraduate Federation in Chest Diseases.
Dr. W. R. Maxted	Honorary doctorate in the Faculty of Medicine, University of Leiden.
Dr. E. R. Mitchell	Member of the Microbiological Committee, Association of Clinical Pathologists; Member of the Council, Association of Clinical Pathologists.
Dr. D. J. H. Payne	Member of the Parliamentary Working Party on Disposal of Sewage; Medical Representative of the Joint Consultive Planning Team for the new Queen Alexandra Hospital, Portsmouth.

Dr. R. Pilsworth	Chairman of the Regional Sub-Committee on Hospital Infection, North East Metropolitan Regional Hospital Board.
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No publication may be reissued to the same borrower until at least seven days have elapsed after its return, neither may it be transferred by one borrower to another.

Publications may not be taken or sent out of the United Kingdom.

Publications returned through the post must be securely packed and adequately protected.

The library may be used for reference by members during the office hours of the Society.

Publications borrowed through the post must be acknowledged on the form provided, immediately upon receipt, and returned when due to the Librarian at the above address.

January, 1968.

O.B., Truro.